

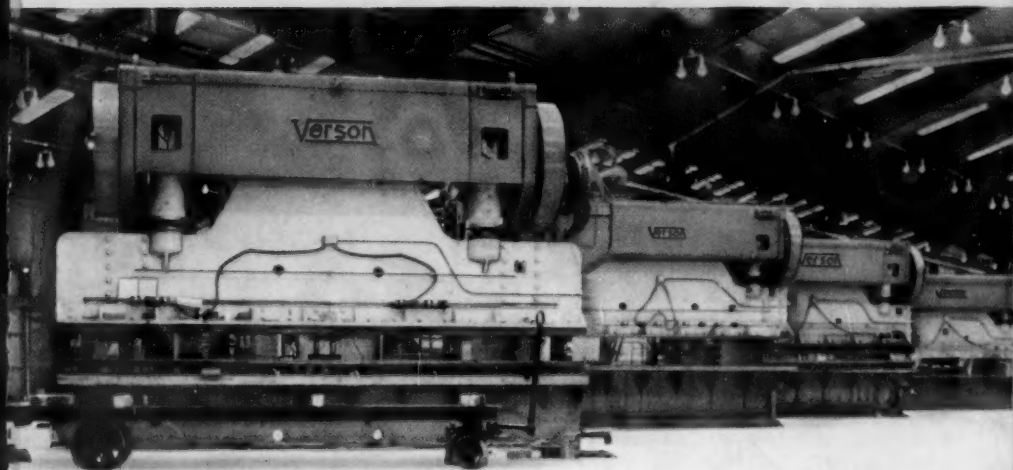
# modern machine shop

**HOT FORMING  
TITANIUM**  
See Page 104

**DRILLING  
SHAFTS**  
See Page 108

**DUPLICATION  
TURNING**  
See Page 132

**AUGUST  
1956**



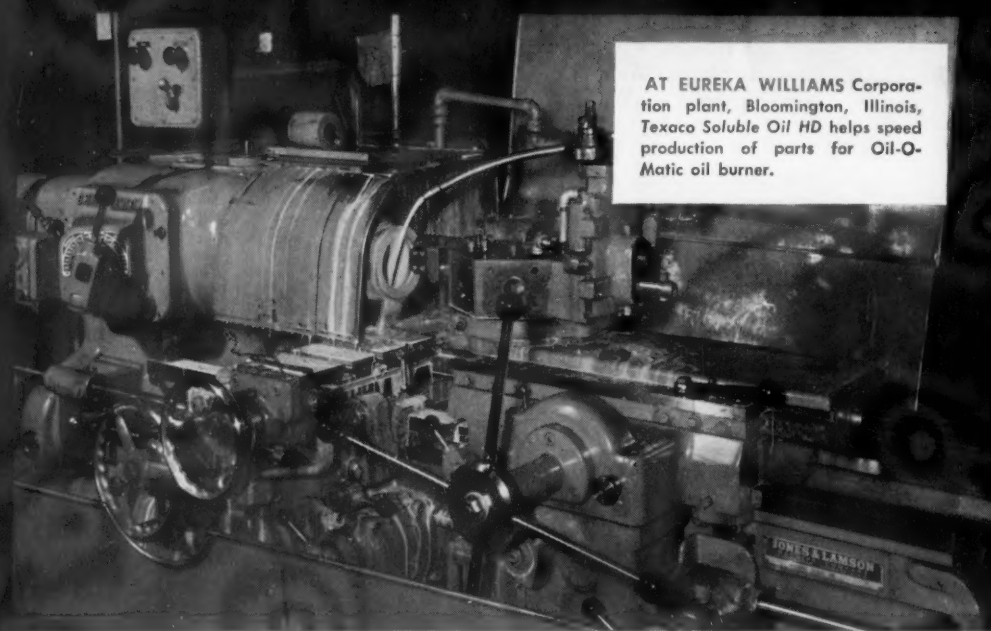
## *Verson design, engineering and craftsmanship*

produced this line-up of Verson Press Brakes for the plant of Butler Manufacturing Company (Canada), Ltd., subsidiary of Butler Manufacturing Company. Ranging in capacity from 190 to 450 tons, these Verson Brakes form a production unit that combines the versatility necessary for multi-purpose manufacture with the efficiency standards necessary for profitable operation. The line currently produces special corrugated sheet steel and structural members.

There are Verson Brakes to do your smallest or your largest job. Write for complete information, or send a resume of your needs for specific recommendations.



**VERSON ALLSTEEL PRESS CO.**  
CHICAGO, ILLINOIS and DALLAS, TEXAS



AT EUREKA WILLIAMS Corporation plant, Bloomington, Illinois, Texaco Soluble Oil HD helps speed production of parts for Oil-O-Matic oil burner.

Eureka Williams' experience shows how you can

## INCREASE PRODUCTION, REDUCE COSTS

"Ours is the oldest name in automatic heating," says Eureka Williams Corporation, "and a big factor in maintaining our position in this highly competitive field has always been our ability to keep our production quality up and our costs low."

"Texaco Cutting, Grinding and Soluble Oils—which we have used for more than ten years—have helped us a lot by giving us exceptionally long tool life, eliminating rusting problems and assuring better finish."

Why not enjoy these benefits in your plant? There is a complete line of *Texaco Cutting, Grinding and Soluble Oils* to help you do all your machining better, faster and at lower cost. A Texaco Lubrication Engineer will gladly help you select the proper ones.

Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write:

The Texas Company, 135 East 42nd Street, New York 17, N. Y.



**EUREKA WILLIAMS** Oil-O-Matic Warm Air Furnaces feature "sealed in steel" construction for cleaner heat, new heat exchanger designed to cut fuel bills. Eureka Williams also makes Gas-O-Matic and Air-O-Matic heating and air conditioning units. Parts for all of them are machined with *Texaco Cutting, Grinding and Soluble Oils*.



# TEXACO

**CUTTING, GRINDING,  
SOLUBLE AND  
HYDRAULIC OILS**



M. L. FORNEY, *Publisher*

RICHARD S. KLINE, *General Manager*

FRED W. VOGEL, *Editor*

HOWARD CAMPBELL, *Editor Emeritus*

ROBERT I. SHORE, *Managing Editor*

GILBERT C. CLOSE, *Contributing Editor*

## modern machine shop

### FEATURES IN THIS ISSUE

- 104** Hot Forming Titanium • *By Deane Noble*
- 108** Novel Setups for Drilling Washing Machine Shafts • *By Robert P. Jones*
- 110** Essential Elements of Thread and Form Rolling • *By Clifford T. Appleton*
- 118** The Quest for the One Best Way • *By W. A. Nordhoff*
- 126** Lathe Setup for Removing Welding Flash
- 132** Duplication Turning in Aircraft Parts Production • *By Gilbert C. Close*
- 142** Machining Stainless Steel • *By G. J. Stevens*
- 146** Converting a Grinder to Increase Production • *By Bartlett West*

### IDEAS FROM READERS

- 152** Indexable Type Flame Cutting Templet • *By Walter Strike*
- 153** Increasing the Capacity of a Milling Machine Vise • *By H. J. Gerber*
- 153** Blueprints Simplify Arrangement of Stock for Assembly Work • *By John Rogers*
- 156** Safety Tongs for Handling Sharp-Edged Blocks • *By Roger Johnson*

### DEPARTMENTS

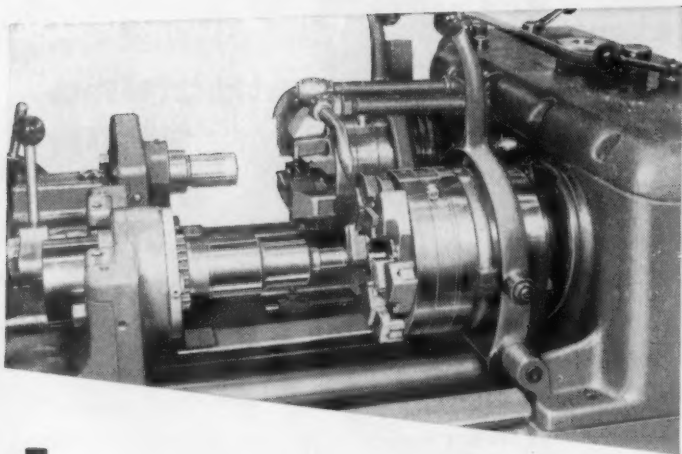
- 48** Important Meeting Dates
- 53** Advertising Representatives
- 92** Over the Editor's Desk
- 160** New Literature
- 166** News of the Industry
- 192** New Shop Equipment
- 304** "Where To Get It"
- 316** Index to Advertisements

Member



Published monthly and copyrighted (1956) by Gardner Publications, Inc., 431 Main St., Cincinnati 2, O.  
Printed in U.S.A. Accepted as controlled circulation publication at Cincinnati, Ohio.

(For more information on cover advertisements, use Reader Service Cards  
opposite pages 32 and 324.)



## **$\frac{3}{4}$ "-4.320" threading range...with one LANDMACO machine**

The Twin Disc Clutch Company Hydraulic Division in Rockford, Illinois, is able to thread a wide variety of work from  $\frac{3}{4}$ "-32 pitch to 4.320"-12 pitch with just one LANDMACO Threading Machine.

A six-chaser 40RX LANCO Head with a range of  $2\frac{1}{2}$ " to  $9\frac{1}{4}$ " ( $5\frac{1}{8}$ " bore) is mounted on the right-hand spindle to produce fine-pitch large-diameter threads. A  $2\frac{1}{2}$ " R LANCO Head with a range of  $\frac{1}{2}$ " to  $2\frac{1}{2}$ " is used on the other spindle to produce coarse-pitch threads, small-diameter threads, and long thread lengths.

One of the many different operations performed by this equipment is illustrated—threading clutch output shafts with the 40RX Head. The workpiece is made from C1045 steel, heat-treated to 229-269 Brinnell hardness. A special 12-pitch UN Thread, with a 3.669"-3.676" pitch-diameter tolerance, is cut .830" long to within  $\frac{1}{4}$ " of the shoulder. 15 pieces are threaded per hour, including 100% inspection by gauging on the machine. Even with heat-treated material and exacting thread finish requirements, 100 pieces are completed between chaser grinds.

Special workholding fixtures (which may be used interchangeably with standard vises) are a major factor in the versatility of this equipment at Twin Disc. In the operation illustrated a special carriage front allows threading a workpiece with a diameter well beyond the normal range of the machine. See Bulletin F-80 or F-90 (Die Heads)—H-76 (LANDMACO Machines).

# **LANDIS *Machine* COMPANY**

457

**WAYNESBORO • PENNSYLVANIA • U. S. A.**

For more data circle 231 on Reader Service Card

# Anderson

## POWER SCRAPER

**cuts 5 hour  
production job  
to 50 minutes**

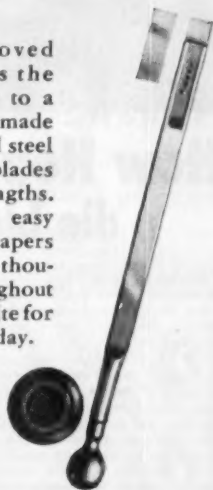


One manufacturer was scraping flat pieces measuring 18 by 24 inches . . . each piece requiring 5 hours to scrape by hand. An Anderson Power Scraper cuts scraping time to 50 minutes! The resulting saving in production costs gave this manufacturer real price advantage. Anderson Power Scrapers have a "natural hand control." Forward stroke can be regulated from  $\frac{1}{4}$ " to  $3\frac{1}{2}$  feet at 60 feet per minute. It is portable and may be plugged into any electric outlet. Write today, let us show you how this Power Scraper can help cut your production costs.



## IMPROVED HAND SCRAPER

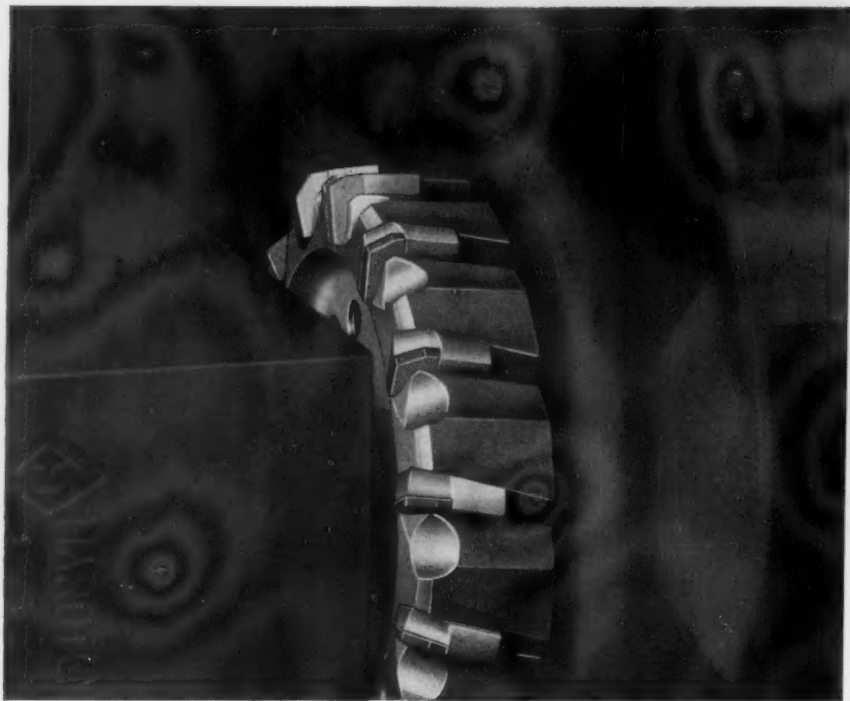
Anderson's improved Hand Scraper cuts the need for regrinding to a minimum. They are made with both high-speed steel and carbide-tipped blades in 18", 20", or 22" lengths. Light-in-weight and easy to use, Anderson Scrapers are proven best in thousands of shops throughout the United States. Write for price information today.



**write for Bulletin 8-22**

**ANDERSON BROS. MFG. CO., ROCKFORD, ILL.**

For more data circle 202 on Reader Service Card



## How Heppenstall's hogmill forged die blocks with facemills

Close-up made at Heppenstall's Bridgeport shows a 1500 pound, 12 x 20 x 20 inch, Hardtem B forged die block being rough milled with a 14 inch O K 9614XX, extra heavy-duty carbide insert blade facemill, incorporating 10 degree negative axial and radial rake angles. Feed, 150 surface feet per minute. Speed, 8½ inches per minute. Depth of cut, ¼ to ½ and often up to ½ inch. Machine, a rebuilt vertical miller with 60 horsepower motor and heavy fly wheel.

IT IS THE SAME STORY EVERYWHERE. Tool engineers prefer O K carbide insert blade cutters for all kinds of tough milling operations . . . facing steel forgings, die blocks, locomotive driving rods, steel castings. There's a reason for this preference. It can be demonstrated by counting the minutes and measuring the metal removed. O K cutters are scientifically designed with various combinations of positive and negative axial and radial rake angles. Scientific designing directs the cutting forces into the body of cutter instead of transversely to the cutting edges. This is necessary because carbides have high compression strength and low transverse rupture strength.

O K cutters are the simplest, the strongest and the toughest ever built. They are heavier, huskier, with more beef in the body. The simple two-piece construction — body and blade — provides more strength and weight to better stand the heavy pull of high powered modern milling machines. Blades are wedge-shaped blocks, the wedge being the strongest mechanical device man has devised. One side of each blade is serrated. Matching serrations are cut into the body. Blades are self-locking, cannot tip or slip. No pins, screws, gibs or locks are needed. To compensate for wear, blades are stepped out one serration and reground. A new set of blades gives you a new cutter. Put your milling problems up to our tool engineers. Write for Catalog 13.



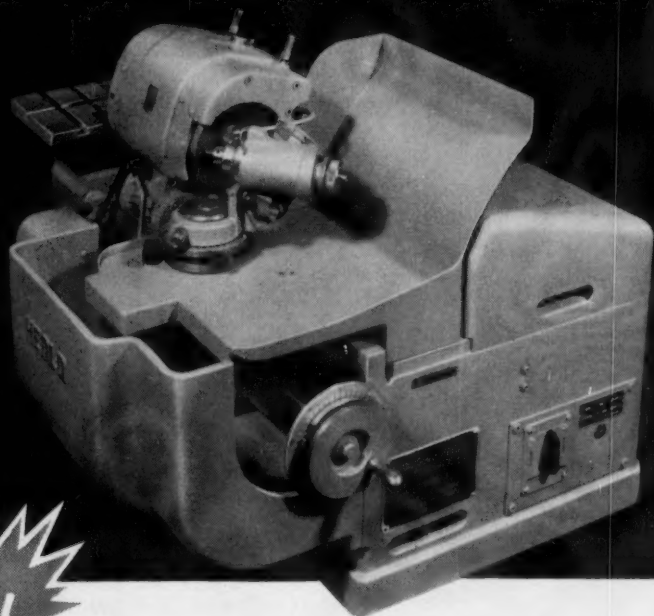
**modern milling cutters  
for modern milling machines**

THE OK TOOL CO., INC., Milford, New Hampshire

For more data circle 203 on Reader Service Card

sharpen your tools

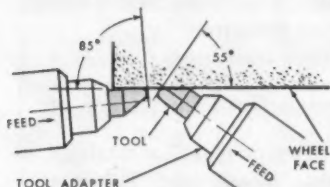
with **MACHINE PRECISION**



**new**

## **HEALD MODEL 3 TOOL SHARPENER**

saves time, gives longer tool life,  
permits faster, more efficient borizing



The oscillating tool holder swings through an arc of up to 150°, to grind a maximum side angle of 85° one side of the tool and 55° on the other side. Front clearance angles are adjustable from -10° to +30° and tool radius can be set anywhere from 0 to 1 3/4". Precision calibrated scales eliminate guesswork and the mechanical machine cycle avoids any possibility of human errors or inaccuracies in the grinding operation.

**L**et's face it. Off-hand grinding just isn't precise enough for modern, high-speed borizing tools. To obtain maximum borizing efficiency, tools must be of the *precisely correct shape*—in complete conformity with *design specifications*.

With the new Model 3 Tool Sharpener, this requirement is met — and easily. Just dial the desired tool shape on the calibrated scales, clamp the tool in the holder and press the start button. Tool holder oscillation and wheel reciprocation are mechanically controlled, grinding up to five different angles and the radius with only an occasional hand adjustment for feeding the tool against the wheel. Precision is far greater than obtainable by off-hand grinding. What's more, any desired tool shape can be *exactly duplicated* again and again.

The mechanical precision built into this improved Model 3 machine assures a sharp, flawless cutting edge that will produce more and better work per sharpening. For complete details, send for Bulletin 2-4-2. **IT PAYS TO COME TO HEALD!**

**THE HEALD MACHINE COMPANY**

Subsidiary of The Cincinnati Milling Machine Co.

**Worcester 6, Massachusetts**

Chicago • Cleveland • Dayton • Detroit • Indianapolis • New York





# A LIFETIME DIAL INDICATOR WITH THE MAINTENANCE-FREE

## "H" MOVEMENT

# NEW



Rugged — shockproof — withstands more impact. Improved life under all conditions. All gears, racks, and pinions precision hardened — friction reduced 16% to 25%, depending upon magnification . . . a new high in sensitivity.

Calibrated accuracy greatly improved. Off-white dials and fine line graduations facilitate readings. Available in four sizes. Enthusiastically received in shop tests.

### You can get the NEW FEDERAL Dial Indicator:

- In 47 Regular Models (any B, C, D, or E size model listed on page 4 of our catalog)
- In 7 Wetproof Models (all Wetproof Models listed on page 6 of catalog)
- In 2 Long Range Models (C81S and D81S, shown on page 7 of catalog)

To specify the new style Lifetime Dial Indicator, merely add "H" after Model Number desired. If you don't have the new Dial Indicator Catalog No. 55 and Price List, write today . . .

**FEDERAL PRODUCTS CORPORATION**

6148 Eddy St. • Providence 1, R. I.

Ask **FEDERAL** First

FOR RECOMMENDATIONS IN MODERN GAGES . . .

Dial Indicating, Air, Electric, or Electronic—for Inspecting, Measuring, Sorting, or Automation Gaging

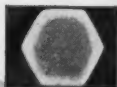
FEDERAL'S SOLUTION  
TO THE COST OF GAGING:  
Impartial Gage Selection  
Engineering Follow-Through  
Everything in Gages

For more data circle 205 on Reader Service Card

6 modern machine shop

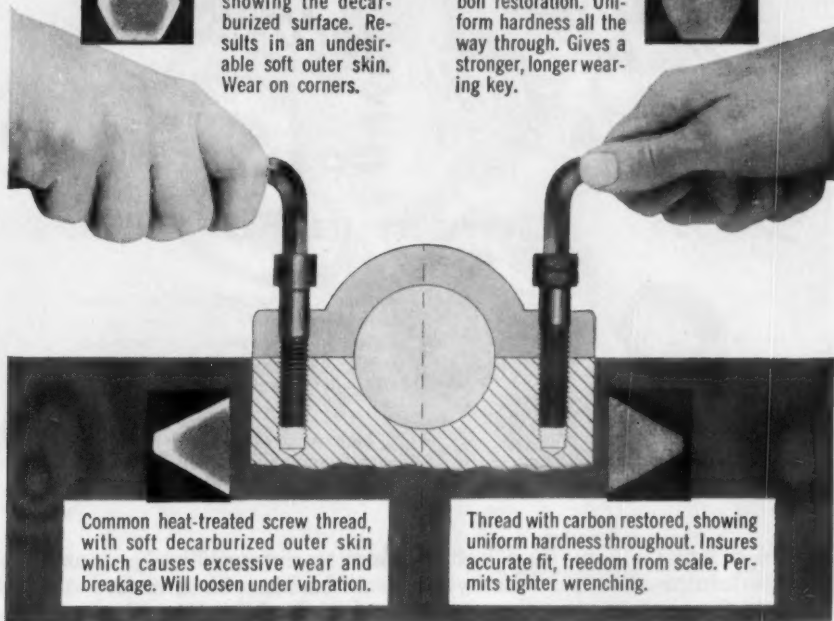
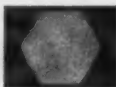
August, 1956

## How carbon affects fastener performance



Common hexagon socket key stock, showing the decarburized surface. Results in an undesirable soft outer skin. Wear on corners.

CHICAGO hexagon socket key--after carbon restoration. Uniform hardness all the way through. Gives a stronger, longer wearing key.



Screw fasteners may look identical, but the microscope reveals wide differences in their ability to "take it".

Steel hardness depends on the precise amount of carbon in its structure. But during steel manufacture this vital surface carbon is inevitably lost. Result (shown above) is a soft, decarburized outer skin in the finished fastener, causing thread stripping, fatigue failure, excessive wear, or loosening under vibration.

The soft "decarb" layer is eliminated

by The Chicago Screw Company's unique "Carbon Restoration" process in which surface carbon is replaced during heat treating. The process is precisely controlled to give uniform hardness from core to surface.

All Chicago "Safety-Plus" Socket Screw Products and heat-treated cap screws have the benefit of *Carbon Restoration* plus complete quality control from start to finish. For full information and catalog, write our Standard Products Division.

## THE CHICAGO SCREW COMPANY

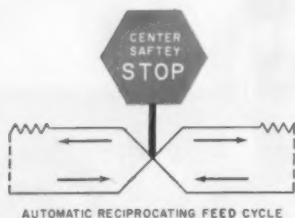
DIVISION OF STANDARD SCREW COMPANY • ESTABLISHED 1872

2803 WASHINGTON BOULEVARD, BELLWOOD, ILLINOIS

For more data circle 206 on Reader Service Card

# *Complete cycle stops every twenty seconds*

... **Cost Savings  
Continue For Years**



Automatic reciprocal milling setups, with center safety stop, may be assigned to Automatic Cycle Machines. That's because automatic backlash eliminator is a standard feature.

A high production two-fixture setup on a CINCINNATI No. 2MI Plain Automatic Cycle Milling Machine.

Here's a way to turn in a better cost performance record when you have high production milling jobs sandwiched in between toolroom quantity lots. Just assign all of them to a machine equipped for both high production and toolroom milling. In the 3 and 5 hp class, CINCINNATI® ML and MI Automatic Cycle Milling Machines will give you the best cost performance record you've ever seen. You can use the automatic table cycles or not, as desired. And for extra high pro-

duction setups, like the one illustrated here with a fixture at each end of the table, you'll appreciate a CINCINNATI more than ever because of these two advantages:

- 1) Automatic backlash eliminator
- 2) Center safety stop

Both are standard features of the ML and MI Automatic Cycle Milling Machines. And for a little extra you can also have automatic spindle stop. Then the complete

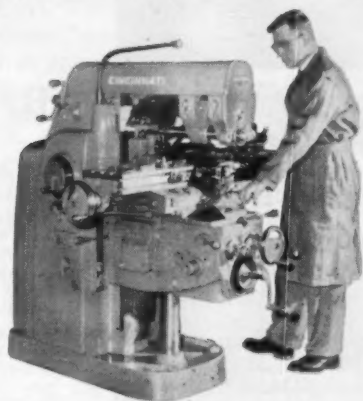


# CINCINNATI



cycle stops while the operator reloads the fixtures; savings in time and money and improvement in operating safety are evident for years. Automatic table cycles in no way affect the versatility of the ML's and MI's for small quantity production. You can see why if you will write for catalog No. M-1916. Brief data contained in Sweet's machine tool file.

**THE CINCINNATI MILLING MACHINE CO.**  
**CINCINNATI 9, OHIO**



CINCINNATI No. 2MI Plain Milling Machine. Complete specifications may be obtained by writing for catalog No. M-1916.

**MILLING MACHINES • CUTTER SHARPENING MACHINES • BROACHING MACHINES • METAL FORMING MACHINES • FLAME HARDENING MACHINES • OPTICAL PROJECTION PROFILE GRINDERS • CUTTING FLUID**

For more data circle 208 on Reader Service Card

August, 1956

modern machine shop 9



## Taft-Peirce Gages have the Bargain Built Right In!

Here are two exclusive reasons why your best buy is always Taft-Peirce Fixed Gages: precision lapping and Electrolizing. Precision lapping eliminates "hills" and "valleys" which cause rapid wear — makes the gage accurate much longer. Electrolizing deposits an extremely hard, dense, non-magnetic alloy on all gaging surfaces, giving exceptional wear resistance, extremely low coefficient of friction, and high resistance to corrosion. Now you can get fixed gages with a much greater life span . . . and the slightly extra cost actually pays for itself! Ask for the Taft-Peirce Handbook showing the complete line of gages and tool-room specialties noted for that extra money-saving "Life-Value". Call your nearest T-P representative or write: The Taft-Peirce Manufacturing Co., Woonsocket, R. I.

**The Taft-Peirce Family** — AIR GAGES • PRECISION GAGES  
MAGNETIC CHUCKS • TOOL-ROOM SPECIALTIES  
GRINDING MACHINES • LAPPING MACHINES



### These will cut your Fixed Gaging Costs

1. Double-end plain cylindrical plug gage
2. Spline ring gage
3. Plain ring gage
4. Thread ring gage
5. Double-end thread plug gage
6. Reversible thread plug gage
7. Single-end plain cylindrical plug gage
8. Single-end thread plug gage

## TAKE IT TO TAFT-PEIRCE

THE TAFT-PEIRCE MANUFACTURING CO.  
WOONSOCKET, R. I.

T-P Means  
TOP  
Precision





## **THIS is No Ordinary Power Hack Saw Blade**

This is the *unbreakable* MARVEL High-Speed-Edge Hack Saw Blade—the first bi-metal blade—invented, developed and introduced by MARVEL. This blade is a combination of two materials best suited to the requirements of an efficient hack saw blade . . . a narrow high speed steel cutting edge permanently welded to a tough, non-brittle alloy steel body. Each blade is triple tempered to assure long life and maximum toughness to the cutting edge.

With a MARVEL Blade, you can cut any material—from the free machining steels to the toughest alloys . . . fast, accurately and economically.

You can tension a MARVEL Blade from 200% to 300% tauter than any ordinary blade, permitting much higher speeds and heavier feeds without deflection or breakage.

Like all good things, attempted copies of the MARVEL Blade have been numerous, but its performance has been *unequalled* by any of the imitators. Ask for MARVEL Blades by name and you can be sure you're getting the best on the market. Leading Industrial Distributors have them in stock.

Write for latest cutting tool Bulletin and the name of your nearest MARVEL Distributor.

FB-1020



**ARMSTRONG-BLUM MFG. CO. 5700 W. Bloomingdale Ave., CHICAGO 39, U.S.A.**

For more data circle 210 on Reader Service Card

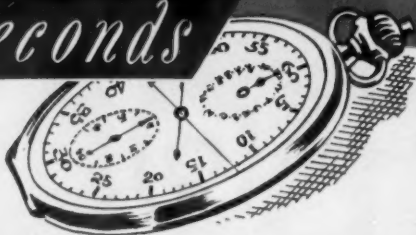
August, 1956

modern machine shop 11

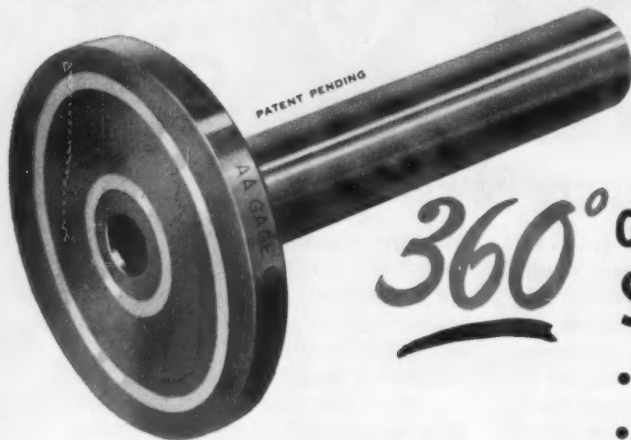
✓ **CHECK SQUARENESS**

**NEW!**

*in seconds*

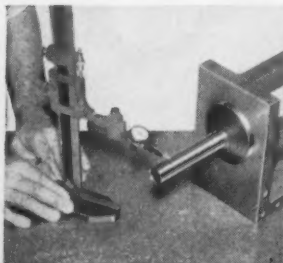


## MAGNETIC CYLINDER SQUARE



***360°* OF ABSOLUTE SQUARENESS**

A POWERFUL MAGNET SECURELY HOLDS THE FACE OF THE CYLINDER SQUARE TO THE SURFACE THAT IS TO BE CHECKED.



- ELIMINATES DISTORTION AND TIME CONSUMING METHOD OF CLAMPING.
- YOU HAVE BOTH SPEED AND ACCURACY.
- CAN BE USED FOR ANY TYPE OF SQUARING OPERATION
- STURDILY CONSTRUCTED FOR HARD USE.
- RE-WORKING IS A SIMPLE PROCESS TO RESTORE ORIGINAL ACCURACY.
- MADE OF SELECTED STEEL TO INSURE STABILITY AND UNIFORMITY.

### STANDARD SIZE:

Approx. 3 1/4" Dia. x 6" Long—\$48 F.O.B. Detroit  
(Complete with Case)

ALSO AVAILABLE: 7 1/2" Dia x 14" Long



**GAGE COMPANY**

350 FAIR ST., Dept. B  
DETROIT 20, MICH.

# Greater Versatility is available with ***Bridgeport*** **MILLERS**

When you buy the BRIDGEPORT TURRET MILLING MACHINE, you buy more than a conventional machine of this type. You actually buy and get a machine in a type which has been conceived, created and developed by Bridgeport. In addition to the turret principle originated by Bridgeport, attachments have been designed which add a great many features to the machine so that its basic purpose for milling, drilling, boring and shaping has been extended to include also cherrying, right angle milling as well as copying with the Bridgeport Hydraulic True Trace Combination.

One of the outstanding advantages of this machine is that you can buy this basic machine with some or all of these attachments or add them later whenever the need arises for the handling of specific operations.



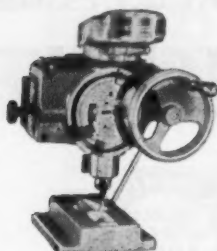
**RIGHT  
ANGLE  
ATTACH-  
MENTS**



(Above) Heavy Duty . . . for milling and drilling at right angles; fits both Master and 1 HP Bridgeport Heads.

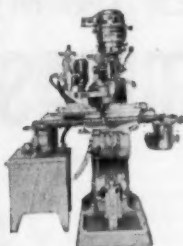


(Above) Light duty . . . for right angle milling and drilling narrow, deep molds and cavities.



**CHERRYING  
ATTACHMENT**

Makes possible production of convex and concave shapes. Ideal for producing drop forge dies, molds, cavities.

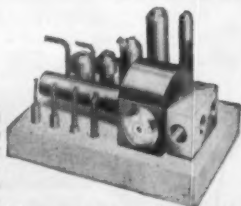


**TRUE TRACE  
COMBINATION**

The Bridgeport True Trace Combination will give excellent performance and save endless hours when copying irregular dies and molds.

**No. 2  
BORING  
HEAD**

Boring Tools and Holder provide means for boring holes up to 6" diameter; available for use on Bridgeport 1 HP Milling, Drilling and Boring Attachment.



Investigation of Bridgeport Milling Machines and their many attachments is always in order.

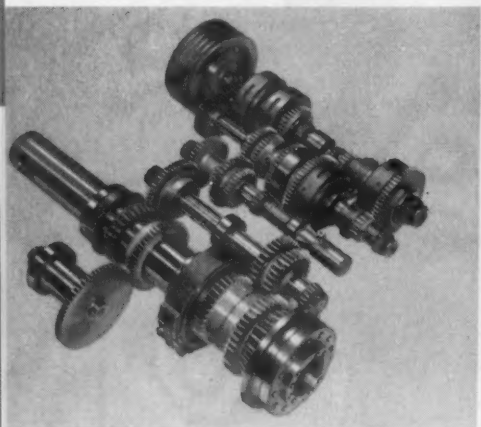
## ***Bridgeport*** **MACHINES, INC.**

Bridgeport, Connecticut

Manufacturers of High Speed Milling Attachments and Turret Milling Machines

For more data circle 212 on Reader Service Card

**WANT MORE POWER, MORE SPEEDS?**



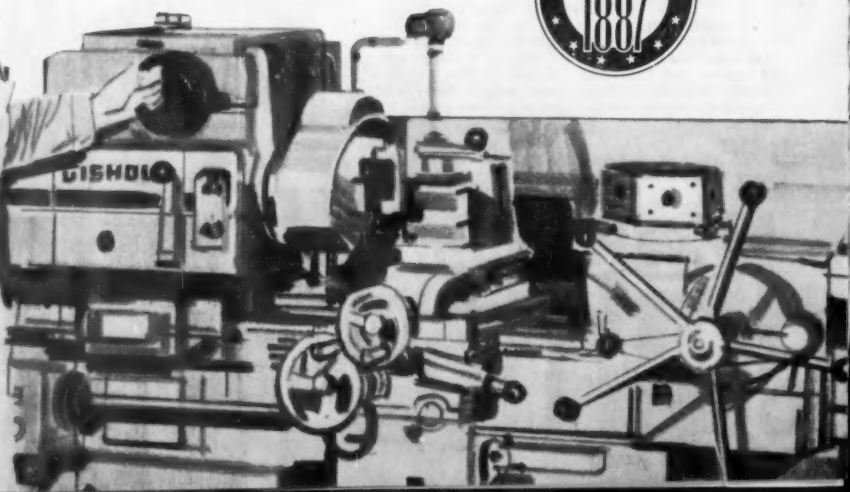
**NEW HEADSTOCK GEAR TRAIN**—sixteen different spindle speeds available, powered by up to 30 h.p. single-speed driving motor delivering full power at all speeds. Spindle is mounted on selected pre-loaded, precision-tapered roller bearings. Heavier, more rugged design provides smoother, quieter power.



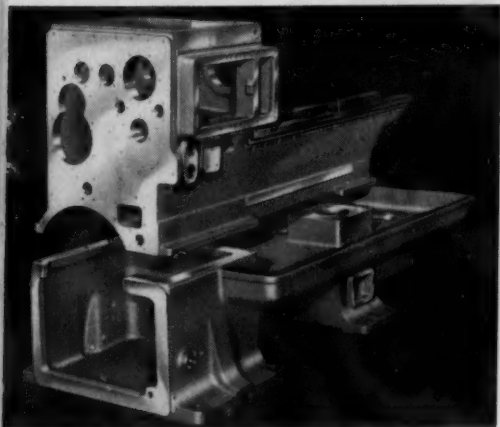
**HYDRAULIC SPEED SELECTOR**—smooth, effortless speed changes. No waiting, no computing, no stopping of spindle, no releasing of main drive clutch. Operates direct or pre-set. Hi-Lo Lever permits instantaneous speed changes in 8:1 ratio without moving Speed Selector handwheel. Multiple Disc Clutches have automatic take-up for wear.

**YOU GET THEM ALL...PLUS**

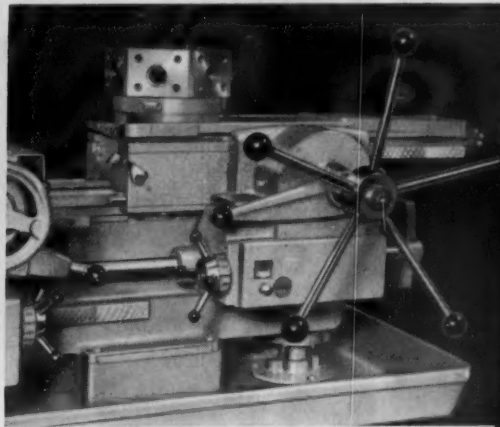
# **NEW GISHOLT MASTERLINE**



## WANT HEAVY CUTS WITHOUT VIBRATION?



**NEW HEADSTOCK AND BED CASTING**—scientific design dampens out vibrations, assures smooth operation and simplifies holding closer tolerances. Made from semi-steel, poured in Gisholt's own foundry. Greater swing over ways permits bigger chucks and broader range of workpiece sizes. Provides a solid foundation for all types of work.



**NEW TURRET RAM AND SADDLE**—designed wider, heavier, more rigid to handle increased capacity and higher speeds. Dial-type feed selector makes feed changes faster, easier. Turret ram rigidly supported on 64-66 Rockwell C alloy steel way strips. Power transmitted through serrated tooth clutches, with shear pin protection against overloading.

## GREATER VERSATILITY...WITH THE RAM TYPE TURRET LATHE

**YOU'LL SPEED UP** your production jobs—both large and small—with this more powerful, more versatile Gisholt MASTERLINE Ram Type Turret Lathe.

Here is a machine designed from end-to-end for easier setups, faster change-over and higher productive output than ever before. Check the advanced features illustrated above. Note the reserve power to handle your heaviest cuts—and to meet your tooling requirements of tomorrow. Note the extra spindle speeds—all at your operator's finger tips, without computing—for faster, better turning of

any type material. And look over the new massive design, the over-all ruggedness that permits greater accuracy, closer tolerances, deeper cuts at punishing feeds without vibration.

Find out now how this powerful, flexible Gisholt MASTERLINE Ram Type Turret Lathe can reduce floor-to-floor time on your specific jobs. Call your Gisholt Representative today—let him show you how this advanced machine can fit most profitably into your production picture. Or write direct to Gisholt for the new literature described below.

**READY NOW**—all-new, 18-page illustrated Bulletin No. 1174-B, covering features, accessories, tools and floor plans on new Gisholt MASTERLINE Ram Type Turret Lathes. Ask for it!



# GISHOLT

MACHINE COMPANY

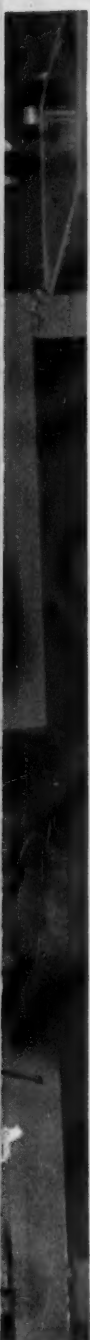
Madison 10, Wisconsin, U.S.A.

TURRET LATHES • AUTOMATIC LATHES • SUPERFINISHERS • BALANCERS • PACKAGING MACHINES • MOLDED FIBERGLAS PLASTICS



*Made with MAGNESIUM*





**A FEW POUNDS make a big difference when jigs have to be moved manually several times an hour.**

## **MAGNESIUM FOR LOW-COST TOOLING**

**Lightweight magnesium tooling plate costs less to buy, less to fabricate and less to use**

- **COSTS LESS TO BUY**—Jigs and fixtures made with magnesium cost you less in every way. Magnesium tooling plate costs less than commonly used lightweight tooling materials.
- **COSTS LESS TO FABRICATE**—Magnesium jigs and fixtures are easy and economical to build, too. The reason is that magnesium tooling plate is easy to machine, easy to weld. It has guaranteed flatness, excellent dimensional stability and freedom from porosity.

- **COSTS LESS TO USE**—Handling costs are also lower when you use magnesium tooling plate. Magnesium weighs one fourth as much as steel and only two thirds the weight of aluminum. By making your jigs and fixtures with lightweight magnesium you'll increase worker efficiency and reduce lost-time injuries.

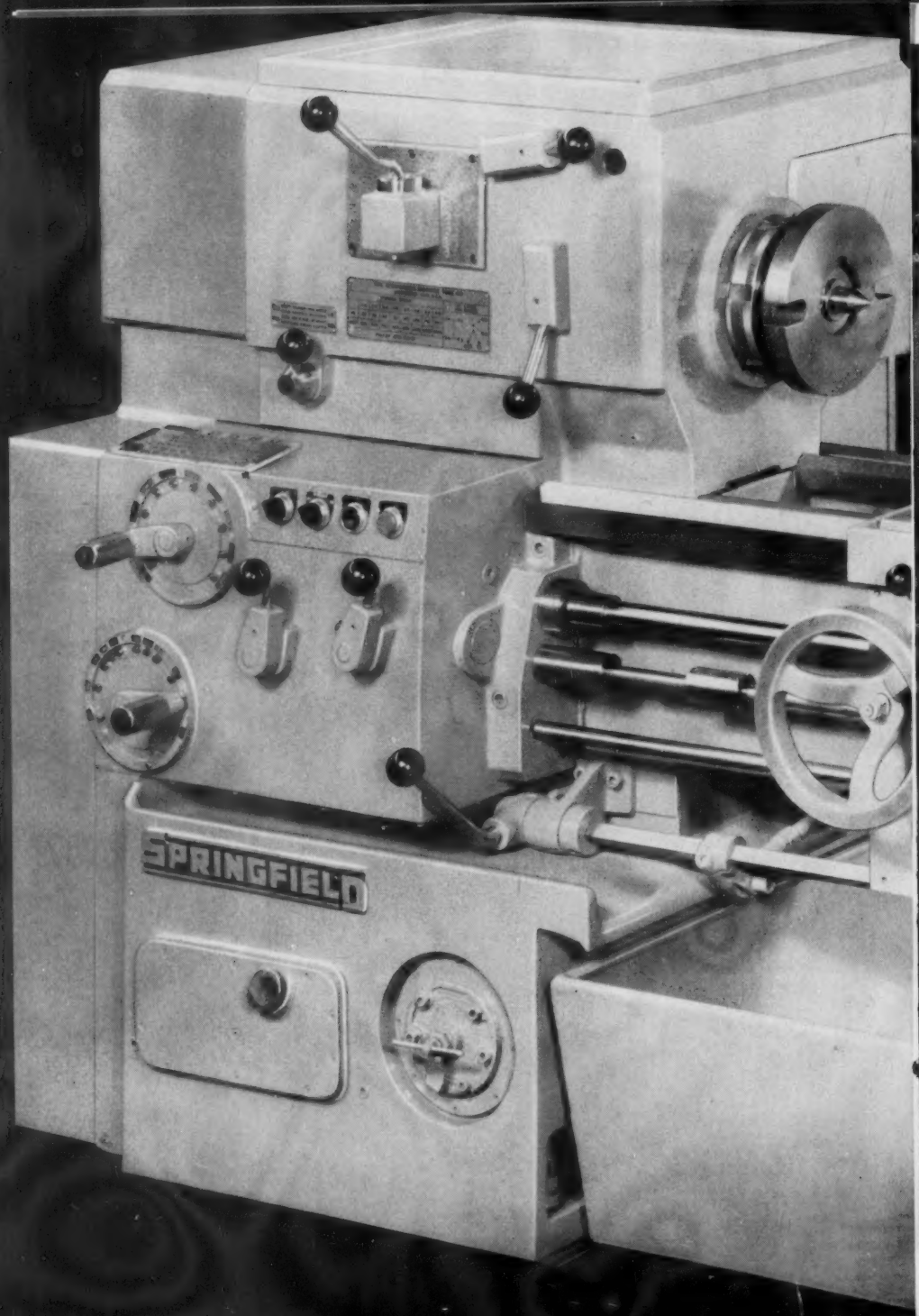
For more information about magnesium tooling plate contact your nearest supplier of Dow magnesium, or write **THE DOW CHEMICAL COMPANY, Midland, Michigan, Dept. MA 371M.**

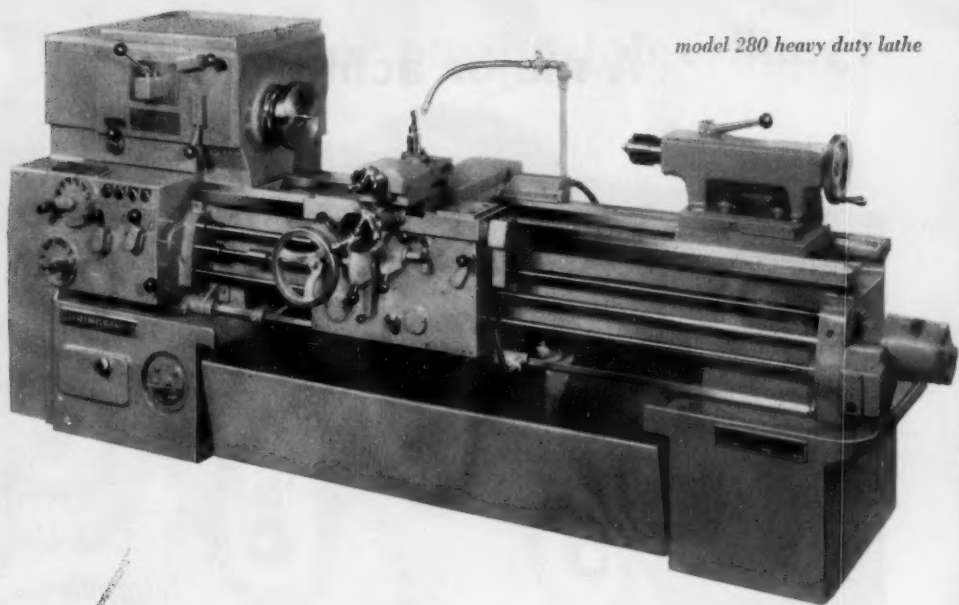
**AVAILABLE FROM STOCK AT:** Copper and Brass Sales, Inc., Detroit, Mich. • Fullerton Steel and Wire Company, Chicago, Ill. • Hubbell Metals Inc., St. Louis, Mo. • A. R. Purdy Co., Inc., Lyndhurst, N. J. • Reliance Magnesium Company, Los Angeles, Calif. • Vinson Steel and Aluminum Co., Dallas, Texas.

*you can depend on **DOW** MAGNESIUM*



For more data circle 216 on Reader Service Card





*model 280 heavy duty lathe*

## it does more work for less money

Springfield is proud to present a new heavy-duty 16" engine lathe, the Model 280. It offers high horsepower—10, 15 or 20 hp—for heavy cuts, clean design, and ease of operation, all at a reasonable price. Direct simplicity and straightforward design assure low maintenance cost.

It has no electronic brain, because Springfield believes that most of today's jobs still require craftsmanship of the human variety. In the Model 280 the price is for the tool, not the brain.

Only the gears necessary for a given speed are in mesh. Sixteen speeds to choose from, 60 feeds and threads—available instantly to any operator. Unique sealed oil spray lubricates and cools gears. It's the lathe most easily converted to contouring and reproducing with accessories, without budget strain. If you're in the quality market for a new heavy-duty lathe that still respects the contribution of craftsmanship, the Model 280 is for you. Basic price FOB Springfield, Ohio, \$8,013.

*The Springfield Machine Tool Company  
Springfield, Ohio*

68TH YEAR OF BUILDING IDEAS INTO MACHINE TOOLS

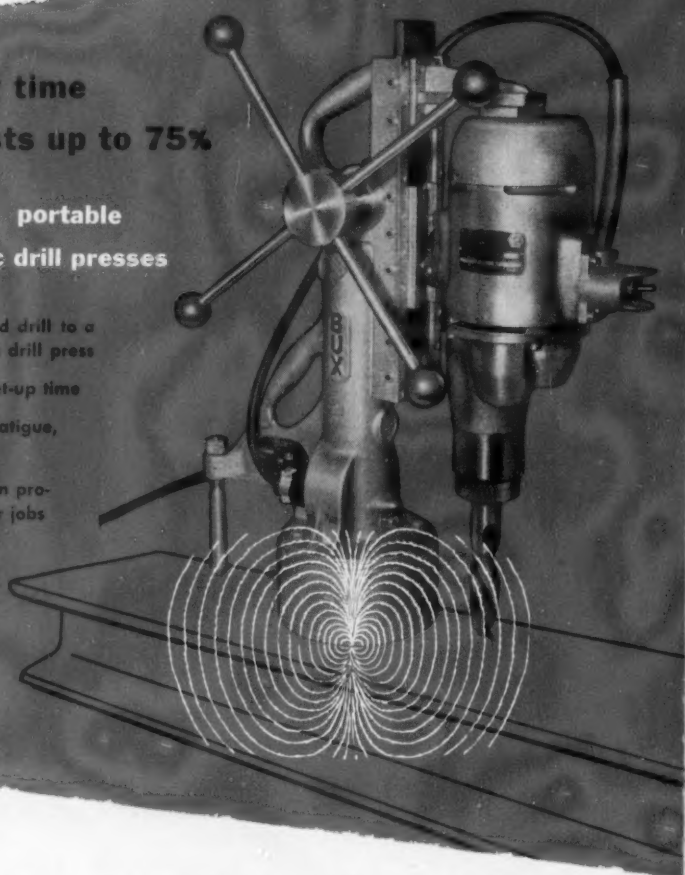
# SPRINGFIELD

# A major achievement in

**Cuts drilling time  
and costs up to 75%**

**BUX** portable  
electro-magnetic drill presses

- Convert your hand drill to a portable precision drill press
- Minimize costly set-up time
- Reduce operator fatigue, increase output
- Simplify drilling on production and repair jobs

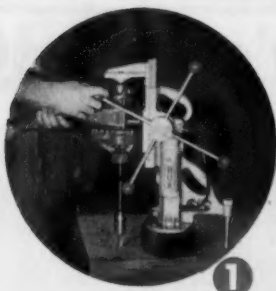


Thousands of applications prove you can now use powerful electro-magnetic forces to hold and position work for drilling. With Bux magnetic drill presses you can convert your air or electric hand drill into a portable precision drill press for shop or field. Compact magnetic base grips work, helps you perform accurate drilling, reaming and tapping in vertical, horizontal and overhead positions!

What holds the work? . . . up to 3 tons of electro-magnetic energy you can control with a flick of the switch! Uses no more power than a 100 watt bulb.

How does it operate? You've seen giant electro-magnetic cranes handling scrap iron. Bux tools apply the same energy principle to the holding and positioning of work.

# production or on-the-job drilling!



1



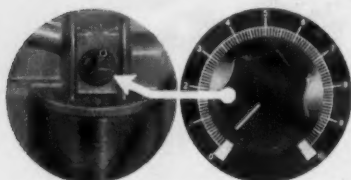
2

① Ideal for drilling work piece not readily moveable to stationary drill presses.

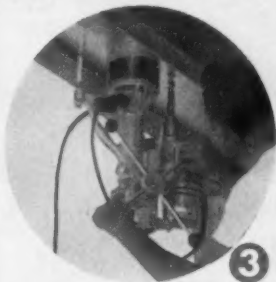
② Drill in any position with accuracy. Power-packed magnet holds drill in place.

③ Cut repair time and costs. Drill and tap precision holes with portable Bux drill presses.

## A precision drill press you can take to the job!



**New!** Infinitely variable switch now permits selecting precise magnetic pull needed to hold drill to work while positioning. Permits moving drill quickly, easily.



3

### BUX MAGNETIC PLATE CLAMPS, DRILL VISES



Here's a totally new method for drilling even irregularly shaped ferrous metal that can cut your work time and costs as much as 65%. With a Bux magnetic drill vise, work is securely held with 2,800 pounds magnetic pull—eliminating time-wasting clamps and chucks. The entire vise surface is a powerful magnetic field.



Welders can position work faster, more accurately with Bux portable magnetic plate clamps. No need to wedge, tack or pre-weld. Up to 6500 pounds of magnetic pull holds work securely while permanent weld is made. Time saved in locking, welding clamps and deburring cuts welding cost in half.

**There's a precision, cost cutting Bux drill press to fit any make portable air or electric drill.**

*Write for complete details, specifications and prices.*

**BUCK MFG., CO., 100 ROBERTS RD. • LOS GATOS, CALIFORNIA**

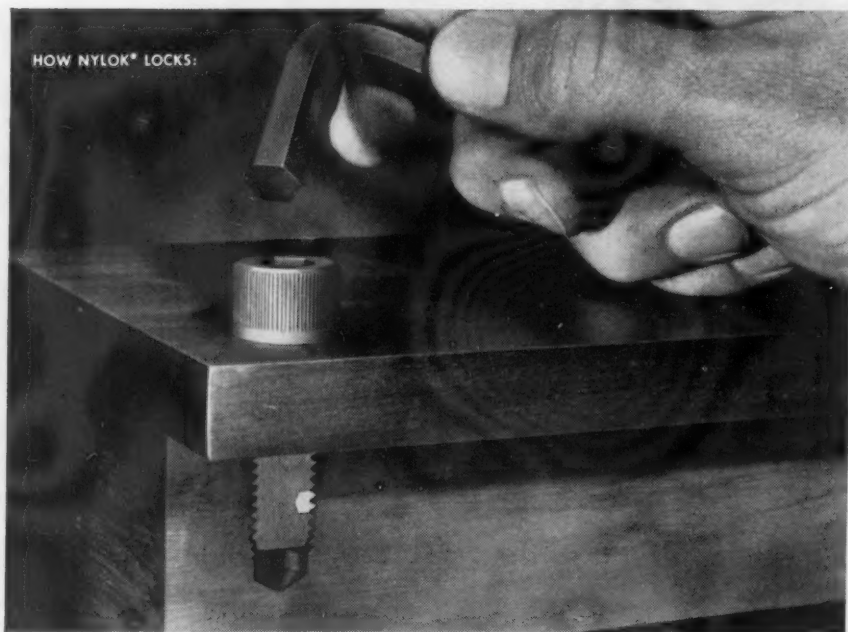
For more data circle 220 on Reader Service Card



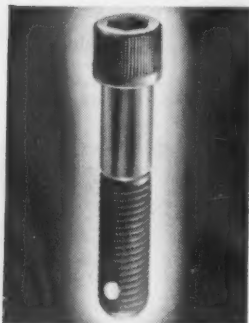
**BUX**



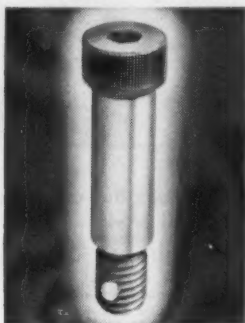
# NEW—a complete line of socket screw products



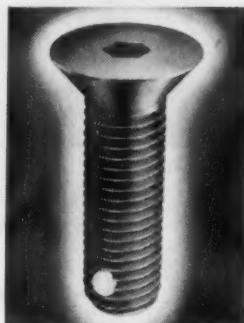
**LOCKED!** The tough, resilient nylon pellet keys itself into the mating threads. It forces threads together, and locks the screw securely.



**Socket head cap screws.**  
Standard sizes #6 to 1 in.



**Socket shoulder screws.**  
Standard sizes  $\frac{1}{4}$  to  $\frac{3}{4}$  in.



**Flat head socket screws.**  
Standard sizes #6 to  $\frac{3}{4}$  in.

# self-locking UNBRAKO that won't work loose

**They simplify design and save production time**

UNBRAKO socket screws are now available embodying the Nylok® self-locking principle. Nylok provides a truly practical new solution to the problem of making screws self-locking.

An UNBRAKO screw with Nylok is a single self-locking unit. No auxiliary locking devices are needed. Just thread the UNBRAKO into any tapped hole. *Seated or not*, it locks positively wherever wrenching stops. The tough, resilient nylon pellet forces mating threads together and holds tight. The screw will not shake loose.

You save production time when you build products with self-locking UNBRAKOS. And you get greater simplicity in design with less bulk and weight. The number of parts you must assemble to achieve full locking action is reduced to the absolute minimum. Lockwashers under screw heads are no longer necessary. Costly

wiring of cross drilled heads is eliminated. So are cotter pins and complex multiple set screw installations.

Self-locking UNBRAKOS are completely reusable. They have uniform locking and installation torques—with no galling or seizing on mating threads. They successfully withstand temperatures from  $-70^{\circ}$  to  $250^{\circ}\text{F}$ . And, on properly seated screws, the pellet acts as a liquid seal.

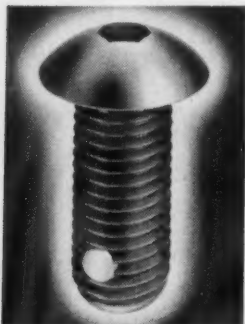
Self-locking UNBRAKO socket screws come in a complete range of standard sizes and materials. See your authorized industrial distributor. Technical data and specifications are detailed in Bulletin 2193. Write us for your copy today. Unbrako Socket Screw Division, STANDARD PRESSED STEEL CO., Jenkintown 22, Pa.  
*\*T.M. Reg. U.S. Pat. Off., The Nylok Corporation*

STANDARD PRESSED STEEL CO.

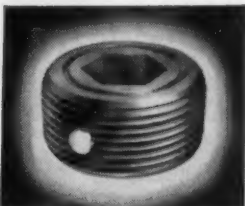
UNBRAKO SOCKET SCREW DIVISION

**SPS**

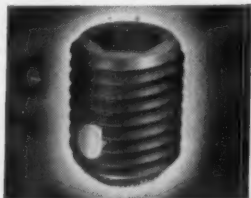
JENKINTOWN PENNSYLVANIA



**Button head socket screws.**  
Standard sizes #6 to  $\frac{1}{2}$  in.



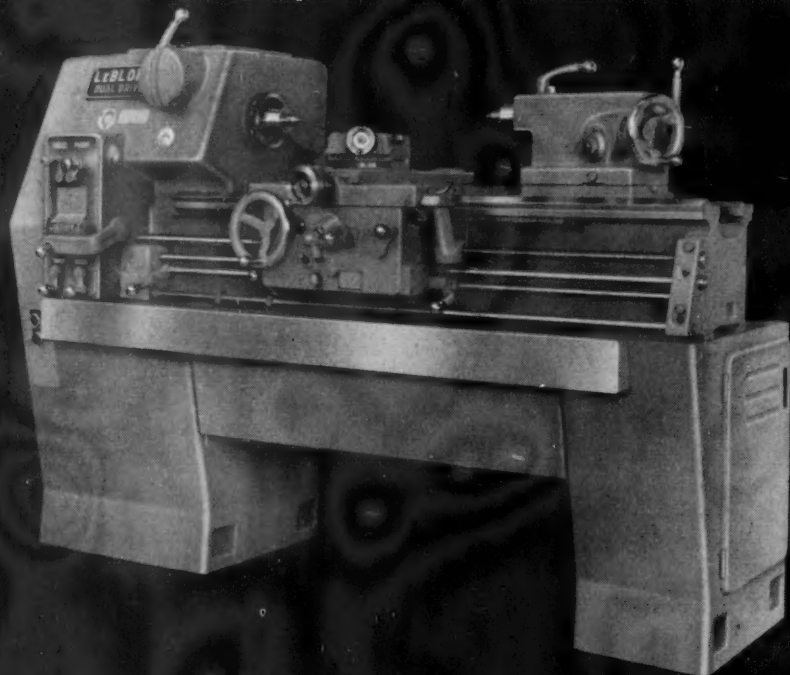
**Socket pressure plugs.**  
Standard sizes  $\frac{1}{8}$  to  $1\frac{1}{4}$  in.



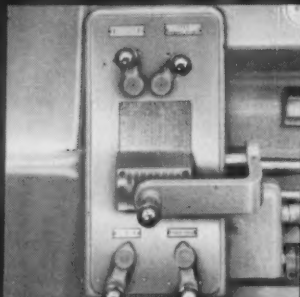
**Socket set screws.** All standard point types. #6 to 1 in.

For more data circle 222 on Reader Service Card

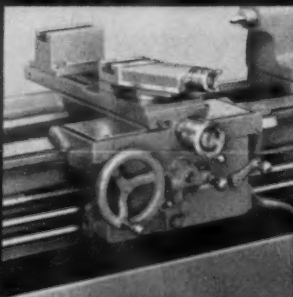
# a LeBlond Dual Drive costs



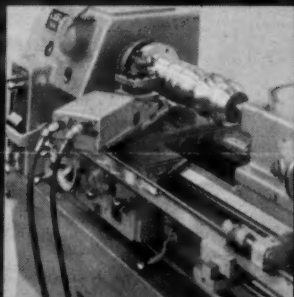
gives you more than higher priced lathes



Totally-enclosed quick change box is automatically lubricated, provides 48 feed and thread changes.



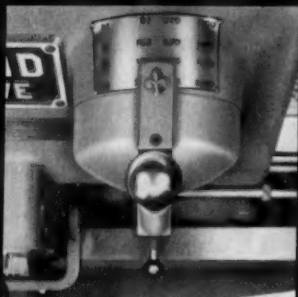
Rugged apron and carriage gives long-lived precision. Shown with compound and plain connected rest.



Hydra-Trace® makes the Dual Drive the least expensive tracing engine lathe of comparable quality.

only \$4625\*

\* Base price, 30" center distance with standard equipment, not including motor or control.



Single lever selects sixteen speeds from 31 to 2400 rpm in both gear and non-slip belt ranges.

More useful power, more swing capacity — plus all the precision, convenience and long life that LeBlond knows best how to put into a lathe! Briefly, this is why the Dual Drive is considered the best buy for medium duty turning by companies who want the most productive capacity per dollar invested.

Virtually all of the 5 hp is available for cutting due to headstock design which uses both gear and non-slip belt ranges. Sixteen speeds from 31 to 2400 rpm are chosen by a single lever.

Swing over bed and carriage wings is 15", over compound, 9½". A single lever controls both cross and length feed. Quick change box is totally-enclosed, provides 48 feed and thread changes. Tailstock is of the thrust-lock design. Hardened and ground steel ways are arranged according to the compensating principle which distributes cutting forces for maximum life and precision.

For specialized turning, a variety of attachments are available. The addition of Hydra-Trace,\* for example, makes Dual Drive the least expensive tracing lathe you can buy of comparable capacity and quality.

Whatever your turning needs, there's a lathe in LeBlond's complete line to do the job. 76 different models to choose from. Call your LeBlond Distributor or write for complete information about the Dual Drive, Bulletin E.

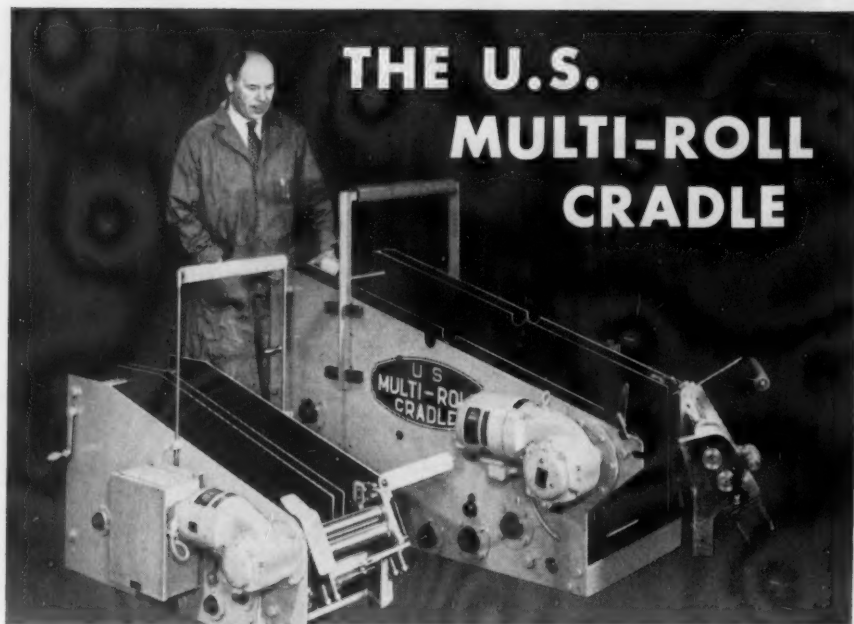
\*Hydra-Trace (Trade Mark registered U. S. Pat. Off.) is LeBlond's heavy-duty hydraulic tracing attachment. Can be mounted in place of compound rest on practically all LeBlond lathes built since 1935.

... cut with confidence



THE R. K. LEBLOND MACHINE TOOL COMPANY  
CINCINNATI 8, OHIO

World's largest builder of a complete line of lathes  
for more than 69 years



## THE U.S. MULTI-ROLL CRADLE

**REDUCE**

**COIL LOADING TIME**

**INCREASE PRODUCTION**



U. S. Multi-Slides  
U. S. Multi-Millers  
U. S. Automatic Press  
Room Equipment  
U. S. Die Sets and  
Accessories

Now made in two sizes (The ACC-1-9-C for material up to nine inches in width, and the larger size, the ACC-16-48 for material up to 16 inches in width), the U. S. Multi-Roll Cradle helps to make your press operations automatic. Both sizes equipped with power driven coil rest rolls plus a pair of hardened and ground take-out rolls to allow controlled unwinding to the very end of the coil.

*Write for Bulletin 90-S giving complete specifications*

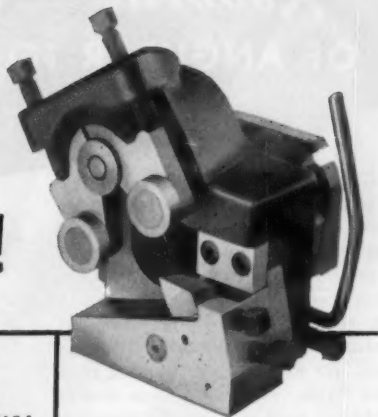
**U.S. TOOL COMPANY, Inc.**

**AMPERE (East Orange)**

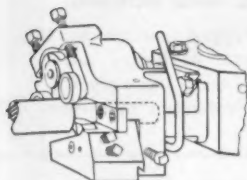
**NEW JERSEY**

For more data circle 225 on Reader Service Card

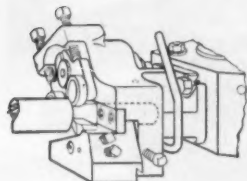
# PROPER TOOLS mean a more PROFITABLE JOB!



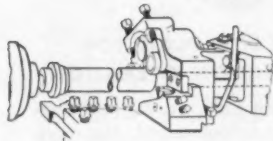
**WITH THIS WARNER & SWASEY  
SINGLE CUTTER TURNER YOU CAN  
BOOST PRODUCTION ON WORK LIKE THIS!**



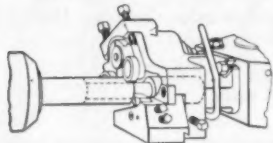
**1. TURN CONCENTRIC DIAMETERS** — rolls ahead of the cutter ride on previously turned diameter, producing accurate size, perfect concentricity.



**2. FINISH TURN TO SIZE** in one pass with a deep cut and heavy feed. Rolls behind the cutter burnish the work to a fine finish.



**3. SINGLE CUTTER TURNER AS A STEADY REST** for heavy forming cuts from the square turret — cutter is withdrawn and anti-friction rolls support work close to the cut.



**4. TURN STEP DIAMETERS** — starting the cutter in a groove machined from the square turret by using the withdrawal lever.

**Production was doubled**, and a grinding operation eliminated, when a Warner & Swasey Single Cutter Turner was used to machine a worm gear shaft made from AISI-A4140 steel.

With this versatile tool you can set up and turn to within  $\pm .001$  in less than 10 minutes.

It's another example of the cost-cutting advantages offered you through the proper use of Warner & Swasey's wide line of almost 600 turret lathe tools!

**WARNER  
&  
SWASEY**  
*Cleveland*

**PRECISION  
MACHINERY  
SINCE 1880**

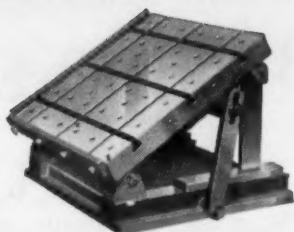
**YOU CAN PRODUCE IT BETTER, FASTER, FOR LESS...WITH A WARNER & SWASEY**

For more data circle 226 on Reader Service Card



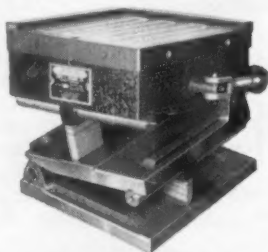
# *Robbins* ...THE COMPLETE LINE OF ANGULAR TOOLING EQUIPMENT

Save dollars in valuable tool room time on every job! Set-ups that require hours by other methods take minutes the Robbins way. Just four simple steps: (1) Look up required angle in Table of Constants furnished with each tool, (2) Select gage blocks from the Table, (3) Place gage blocks between base of unit and sine bar swivel block, (4) Secure the work . . . and you're ready to go! Complete range of models and sizes brings Robbins precision equipment within the reach of every shop, large or small.



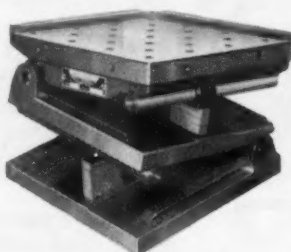
## HEAVY DUTY SINE PLATES FOR MILLING AND BORING

Fool proof! Rugged enough to take thrust and chatter of heavy cuts . . . yet built to tool room accuracy for the most exacting inspection operations.



## "MAGNA-SINE" MAGNETIC TABLES FOR PRECISION GRINDING

Set up and grind any single or compound angle fast! Work is held securely by magnetic attraction, clamped or released in an instant. Work can't warp or move.



## INSPECTION SINE PLATE FOR EVERY INSPECTION OPERATION

Eliminate chance of errors in inspection department and tool room! No more V-blocks, angle plates, or complicated built-up sets of blocks. Simple, fast and sure.

Write or call for complete information now!

**OMER E.**

*Robbins*

**COMPANY**

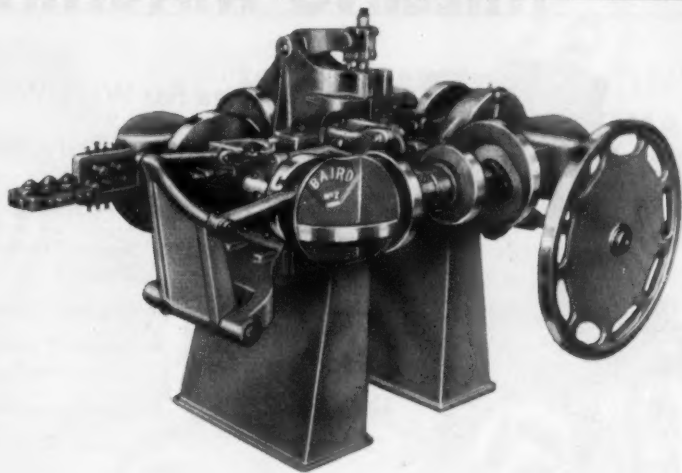
24800 PLYMOUTH ROAD

DEPT. B-7

DETROIT 39, MICH.

*Also producers of special machinery, gages and fixtures*

...ask **BAIRD** about it



### The "hidden bargain" in a **BAIRD** Four-Slide

Thousands of Baird Four-Slide users...making everything from auto seat springs to bobby pins...say it isn't hard to find.

The "hidden bargain" is the cost-reduction know-how that goes along with every machine sold.

Baird pioneered the four-slide machine as the basic round and ribbon wire forming equipment used by every industry making such products. Baird has the most extensive experience files on tooling for this most versatile of high production equipment. Usually the problem that seems tough to the customer can be matched to a previous successful Baird application...thereby saving time and money in tooling.

With such a reservoir of past practical experience to draw upon, it's always good business to "ask Baird about it" when a four-slide application is being considered. Our range of standard automatic wire forming machines is complete, from the "bench top" No. 00 (400 lbs.) to the "room size" No. 8 (12,000 lbs.)...also two standard sizes of ribbon metal forming machines. Bulletin on request. Write Dept. M.M.

**THE BAIRD MACHINE COMPANY**  
STRATFORD CONNECTICUT

18A56

For more data circle 226 on Reader Service Card

August, 1956

modern machine shop 29

**HARDINGE**  
ELMIRA, N.Y.

# High Speed Precision MILLING MACHINES



The RIGHT Size For Work Which Is  
Too Small for Heavy Duty Millers.

## Advantages

- Saves Production Time
- Higher Speeds
- Lower Power Consumption
- Less Investment
- Saves Floor Space

1  $\frac{1}{8}$ " Cutter Spindle Capacity  
with 5C Round Hardinge Collet  
Eight Spindle Speeds —  
110 to 1850 R.P.M.

Write for  
Bulletin TM-UM



Model UM Universal Spiral Miller  
Model TM Universal Plain Miller

**HARDINGE BROTHERS, INC., ELMIRA, N. Y.**

For more data circle 229 on Reader Service Card

# MACHINE OF THE MONTH

PREPARED BY THE SENECA FALLS MACHINE CO. "THE Lo-owing PEOPLE" SENECA FALLS, NEW YORK



## SENECA FALLS MODEL "LN" LATHE IS EQUIPPED AND AUTOMATED FOR SPECIALIZED PRODUCTION JOB

*Seneca Falls Model "LN" Automatic Lathe designed with standardised units including a "PACKAGED" automatic loader and ejector mechanism.*

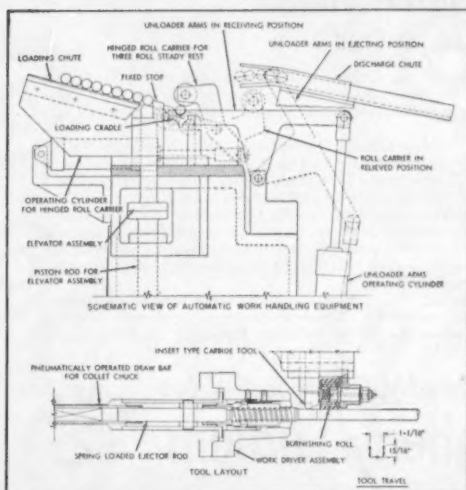
**PROBLEM:** To remove welding flash from worm shaft assemblies on a high-production basis.

**SOLUTION:** A Seneca Falls Model "LN" Automatic Lathe was equipped with certain standardized units to provide a specialized high-production machine at substantial savings in initial cost and lead time.

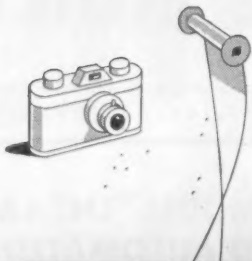
Red hot welded parts are delivered by a conveyor, which joins the loading chute shown in the line drawing illustrating the automatic work handling equipment. The work piece is held and driven in a collet chuck and supported by a hinged three-roll steady rest. A carbide tool on an overhead slide removes the hot flash and is followed by a burnishing roll which smooths the junction of the welded parts.

The entire loading, machining and unloading operations are entirely automatic; however, push button controls are installed for the manual operation of each movement. The loading cycle cannot get out of time since the automatic sequence is controlled by a system in which each movement is initiated by the completion of the preceding movement. A production of 275 pieces per hour is readily obtained with this equipment.

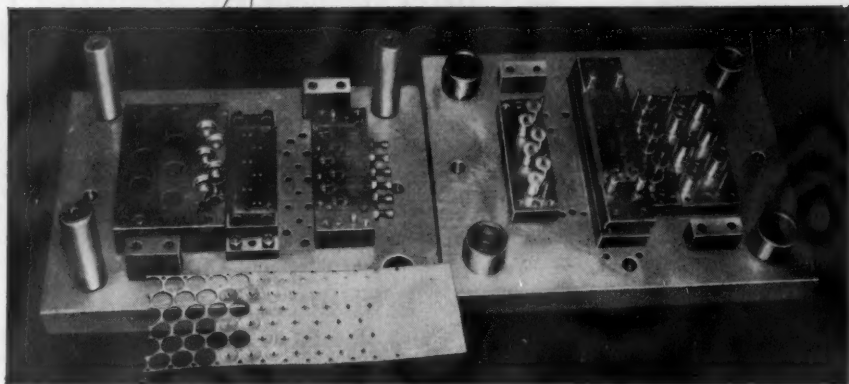
SENECA FALLS MACHINE CO., SENECA FALLS, N. Y.



**PROFIT ENGINEERED BY SENECA FALLS**



## Over 150 Million Stampings from this **ONTARIO** Die



### 600,000 Film Spool Flanges PIERCED, EMBOSSED, STAMPED and BLANKED per Grind



Production engineers at an eastern camera manufacturing plant have reported excellent results from their Ludlum Ontario film-spool-flange die. The Ontario die performs the multiple operations of piercing, embossing, stamping, and blanking.

Operating at 130 strokes a minute, the big die has produced over 150,000,000 parts. Runs as high as 600,000 have been made between grinds. For this operation, Ontario is air cooled from a temperature of 1850 F, then tempered at 350 F for six hours. This results in a Rockwell C hardness of 60-62.

Ludlum Ontario is an air hardening die steel of the high carbon/high chromium type. It has all the desirable properties of such steels—resistance to abrasion, high hardness and excellent non-deforming characteristics. In addition, it is tougher but easier to machine than the higher carbon/high chromium types which are usually oil hardening.

For the finest in tool steel to help solve your cutting, forming, or blanking problems, call your nearest A-L office or distributor today, or write **Allegheny Ludlum Steel Corporation, Oliver Building, Pittsburgh 22, Pennsylvania.**

#### Write for your **ONTARIO BLUE SHEET**

A concise 4-page booklet of facts on the handling and shop treatments of Ontario. Included is complete information on forging, annealing, tempering, etc. and detailed laboratory data on physical characteristics. Ask for your free copy.

Address Dept. M5-80

## For complete MODERN Tooling, call **Allegheny Ludlum**

WAD 3248



For more data circle 231 on Reader Service Card

↓ Use this Reader Service Card for requesting more information on products described and advertised ↓

# READER SERVICE CARD

August 1956 Issue

GOOD UNTIL OCTOBER 1, 1956

Your Name \_\_\_\_\_

Your Title \_\_\_\_\_

Company Name \_\_\_\_\_

Company Address \_\_\_\_\_

City \_\_\_\_\_

Zone \_\_\_\_\_

State \_\_\_\_\_

Products Manufactured \_\_\_\_\_

Number of Plant Employees \_\_\_\_\_

Circle KEY numbers (NOT PAGE NUMBERS) for more information on items described or advertised in this issue.

## EDITORIAL ITEMS

1	21	41	61	81	101	121	141
2	22	42	62	82	102	122	142
3	23	43	63	83	103	123	143
4	24	44	64	84	104	124	144
5	25	45	65	85	105	125	145
6	26	46	66	86	106	126	146
7	27	47	67	87	107	127	147
8	28	48	68	88	108	128	148
9	29	49	69	89	109	129	149
10	30	50	70	90	110	130	150
11	31	51	71	91	111	131	151
12	32	52	72	92	112	132	152
13	33	53	73	93	113	133	153
14	34	54	74	94	114	134	154
15	35	55	75	95	115	135	155
16	36	56	76	96	116	136	156
17	37	57	77	97	117	137	157
18	38	58	78	98	118	138	158
19	39	59	79	99	119	139	159
20	40	60	80	100	120	140	160

## ADVERTISEMENTS

First Cover	Second Cover	Third Cover	Fourth Cover
201	239	258	277
202	221	240	259
203	222	241	260
204	223	242	261
205	224	243	262
206	225	244	263
207	226	245	264
208	227	246	265
209	228	247	266
210	229	248	267
211	230	249	268
212	231	250	269
213	232	251	270
214	233	252	271
215	234	253	272
216	235	254	273
217	236	255	274
218	237	256	275
219	238	257	276
220	239	258	277
221	240	259	278
222	241	260	279
223	242	261	280
224	243	262	281
225	244	263	282
226	245	264	283
227	246	265	284
228	247	266	285
229	248	267	286
230	249	268	287
231	250	269	288
232	251	270	289
233	252	271	290
234	253	272	291
235	254	273	292
236	255	274	293
237	256	275	294
238	257	276	295
239	258	277	296
240	259	278	297
241	260	279	298
242	261	280	299
243	262	281	300
244	263	282	301
245	264	283	302
246	265	284	303
247	266	285	304
248	267	286	305
249	268	287	306
250	269	288	307
251	270	289	308
252	271	290	309
253	272	291	310
254	273	292	311
255	274	293	312
256	275	294	313
257	276	295	314
258	277	296	315
259	278	297	316
260	279	298	317
261	280	299	318
262	281	300	319
263	282	301	320
264	283	302	321
265	284	303	322
266	285	304	323
267	286	305	324
268	287	306	325
269	288	307	326
270	289	308	327
271	290	309	328
272	291	310	329
273	292	311	330
274	293	312	331
275	294	313	332
276	295	314	333
277	296	315	334
278	297	316	335
279	298	317	336
280	299	318	337
281	300	319	338
282	301	320	339
283	302	321	340
284	303	322	341
285	304	323	342
286	305	324	343
287	306	325	344
288	307	326	345
289	308	327	346
290	309	328	347
291	310	329	348
292	311	330	349
293	312	331	350
294	313	332	351
295	314	333	352
296	315	334	353
297	316	335	354
298	317	336	355
299	318	337	356
300	319	338	357
301	320	339	358
302	321	340	359
303	322	341	360
304	323	342	361
305	324	343	362
306	325	344	363
307	326	345	364
308	327	346	365
309	328	347	366
310	329	348	367
311	330	349	368
312	331	350	369
313	332	351	370
314	333	352	371
315	334	353	372
316	335	354	373
317	336	355	374
318	337	356	375
319	338	357	376
320	339	358	377
321	340	359	378
322	341	360	379
323	342	361	380
324	343	362	381
325	344	363	382
326	345	364	383
327	346	365	384
328	347	366	385
329	348	367	386
330	349	368	387
331	350	369	388
332	351	370	389
333	352	371	390
334	353	372	391
335	354	373	392
336	355	374	393
337	356	375	394
338	357	376	395
339	358	377	396
340	359	378	397
341	360	379	398
342	361	380	399
343	362	381	400
344	363	382	401
345	364	383	402
346	365	384	403
347	366	385	404
348	367	386	405
349	368	387	406
350	369	388	407
351	370	389	408
352	371	390	409
353	372	391	410
354	373	392	411
355	374	393	412
356	375	394	413
357	376	395	414
358	377	396	415
359	378	397	416
360	379	398	417
361	380	399	418
362	381	400	419
363	382	401	420
364	383	402	421
365	384	403	422
366	385	404	423
367	386	405	424
368	387	406	425
369	388	407	426
370	389	408	427
371	390	409	428
372	391	410	429
373	392	411	430
374	393	412	431
375	394	413	432
376	395	414	433
377	396	415	434
378	397	416	435
379	398	417	436
380	399	418	437
381	400	419	438
382	401	420	439
383	402	421	440
384	403	422	441
385	404	423	442
386	405	424	443
387	406	425	444
388	407	426	445
389	408	427	446
390	409	428	447
391	410	429	448
392	411	430	449
393	412	431	450
394	413	432	451
395	414	433	452
396	415	434	453
397	416	435	454
398	417	436	455
399	418	437	456
400	419	438	457
401	420	439	458
402	421	440	459
403	422	441	460
404	423	442	461
405	424	443	462
406	425	444	463
407	426	445	464
408	427	446	465
409	428	447	466
410	429	448	467
411	430	449	468
412	431	450	469
413	432	451	470
414	433	452	471
415	434	453	472
416	435	454	473
417	436	455	474
418	437	456	475
419	438	457	476
420	439	458	477
421	440	459	478
422	441	460	479
423	442	461	480
424	443	462	481
425	444	463	482
426	445	464	483
427	446	465	484
428	447	466	485
429	448	467	486
430	449	468	487
431	450	469	488
432	451	470	489
433	452	471	490
434	453	472	491
435	454	473	492
436	455	474	493
437	456	475	494
438	457	476	495
439	458	477	496
440	459	478	497
441	460	479	498
442	461	480	499
443	462	481	500
444	463	482	501
445	464	483	502
446	465	484	503
447	466	485	504
448	467	486	505
449	468	487	506
450	469	488	507
451	470	489	508
452	471	490	509
453	472	491	510
454	473	492	511
455	474	493	512
456	475	494	513
457	476	495	514
458	477	496	515
459	478	497	516
460	479	498	517
461	480	499	518
462	481	500	519
463	482	501	520
464	483	502	521
465	484	503	522
466	485	504	523
467	486	505	524
468	487	506	525
469	488	507	526
470	489	508	527
471	490	509	528
472	491	510	529
473	492	511	530
474	493	512	531
475	494	513	532
476	495	514	533
477	496	515	534
478	497	516	535
479	498	517	536</



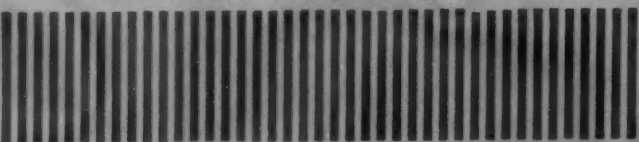
FIRST CLASS  
PERMIT No. 7414  
NEW YORK, N. Y.

BUSINESS REPLY CARD  
No Postage Stamp Necessary If Mailed in the United States

4c POSTAGE WILL BE PAID BY—

modern  
machine  
shop

BOX 74  
VILLAGE STATION  
NEW YORK 14, NEW YORK



# NOW BETTER GROUND FINISHES!

with J&S guaranteed\* self-adjusting  
live centers



**ACCURACY .0001"**

OR LESS

**FOR LATHES, GRINDERS**

**PERFECTION LIVE CENTERS**

SPINDLE TYPE

**\*GUARANTEED 2000 HOURS OR 1 YEAR**

## **SIMPLE DESIGN:**

Only six parts. One-piece main body serves as cup for roller bearing on which spindle turns. Allows much greater capacity bearing in same size body.

## **AUTOMATICALLY ADJUSTS FOR WEAR:**

End thrust from work keeps tapered roller bearing perfectly seated—bearing cone and inner race of ball bearing are pressed on spindle; outer race is a light press fit into main body.

## **ABSOLUTE CONCENTRICITY AND ALIGNMENT FOR BEARINGS:**

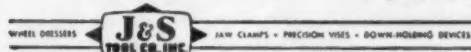
Both conical and cylindrical bores of body are ground at same setting in work head. Point is ground under load in its own bearings to insure running dead true.

### **TAPERS AVAILABLE**

MORSE	JARNO	B & S	NORTON	LANDIS
2 to 7	6 to 20	7 to 18	10 to 24	.8125 1.3350 1.7500
SPECIAL POINTS, HEADS, SHANKS AND TAPERS MADE TO ORDER				

### **FOR INFORMATION**

See your industrial distributor or write for free literature.

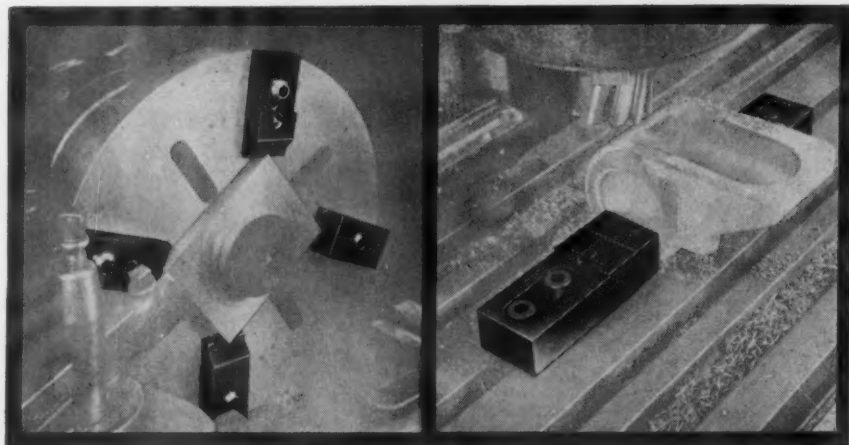


**J & S TOOL CO., INC.**

**CLAMPCUT**

**871 DORSA AVE.  
LIVINGSTON, NEW JERSEY**

For more data circle 232 on Reader Service Card



J & S "All-Purpose" JAW CLAMPS CAN BE USED ON ALL STANDARD TYPES OF MILLING MACHINES, LATHES, PLANERS, BORING MILLERS, DRILL PRESSES, AND OTHER MACHINE TOOLS

## Eliminate "U" Clamps, Straps and Fingers, cut handling time 75%

J & S "All-Purpose" Jaw Clamps give you many unusual advantages in securing workpieces to machine tools—save as much as 75% of the time required with outdated methods.

### Downholding Principle

J & S' *downholding* principle makes this possible. Here's how it works: When you turn the adjusting screw of the clamp, the jaw travels straight *in* and *down*. This forces the workpiece horizontally against the opposite clamp and downward against the face plate or table. In this way, centering is quick, simple. The tapered slot prevents the clamp from slipping regardless of the load.

### Need no U-clamps or straps

With J & S "All-Purpose" Jaw Clamps, you can avoid the use of U-clamps and straps, disregard different length studs and blocking. You can also minimize obstructions in set-ups, reduce cut-off waste. You can pass over J & S Jaw Clamps 1" from the working surface of the machine face. The whole surface of the workpiece can be machined to within  $\frac{1}{8}$ " of the face plate or table.

You can get J & S "All-Purpose" Jaw Clamps in a variety of sizes. Write for complete information today.

### J & S "JUMBO" and "LI'L GIANT" JAW CLAMPS

For large planers

Many times more powerful than finger set-ups



COMPLETELY HARDENED



Both clamps have T-nuts which fit all large standard planers. 45° oblique travel of jaw secures workpiece against table and against counterthrust of opposite clamp.  $\frac{1}{8}$ " back taper (dotted line) and relieved ground surface (magnified detail) prevent slippage.



WHEEL DRESSERS • JAW CLAMPS • PRECISION VISES • SINE BARS • DOWN-HOLDING DEVICES

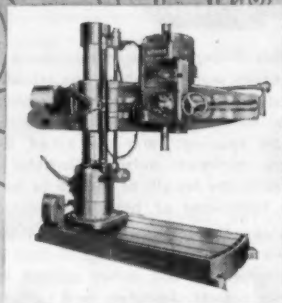
871 DORSA AVENUE, LIVINGSTON, NEW JERSEY

For more data circle 233 on Reader Service Card

**NOW...for every production need there's a**

*Morris*  
MOR-SPEED

## Radial Drill



### **RUGGED 9"-11" radial drills** *with centralized controls*

Every control in sight, within reach, easy to operate, fumble-free. Rugged construction, massive rigidity. Exceptional balance, plus accurate spindle speed and feed, assures maximum operating precision.

*There's a Morris Mor-Speed Radial Drill to satisfy your most exacting specifications. Write for complete detailed information and prices!*

**THE MORRIS MACHINE TOOL CO.**  
934 Harriet St., Cincinnati 3, Ohio



### **NEW 13"-15" hydropower radial drills** *with preselective settings*

The ultimate in drilling speed and operational ease. Hydraulically powered, push button operated features include: head traverse; gear shifting; arm raising, lowering, clamping, unclamping; column and head clamping. Preselection of spindle feeds and speeds while drill is in action.



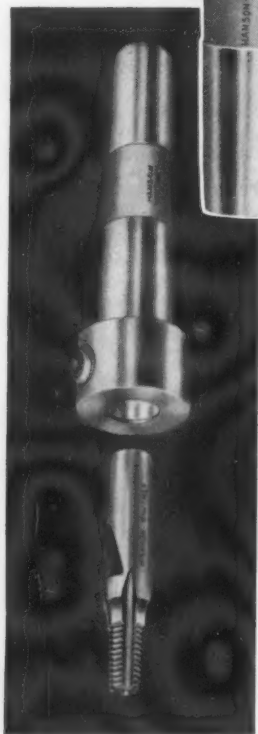
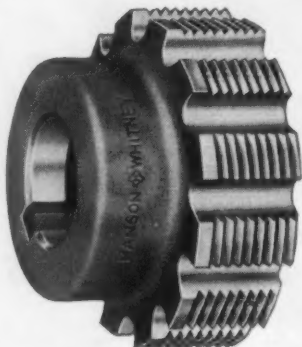
*Morris*

For more data circle 234 on Reader Service Card



**FINISHED AFTER HARDENING...**

## **Hanson-Whitney MULTIPLE THREAD MILLING CUTTERS**



Over 35 years of experience in designing and manufacturing top quality multiple cutters has established Hanson-Whitney first in the field. Hanson-Whitney's exclusive *finished after hardening* process provides extremely close limits in tooth spacing, form and relief. Ground thread cutters assure minimum outside diameter run-out . . . does not restrict the length of thread to be milled, while maintaining tolerances of parallelism or desired taper. Hanson-Whitney Cutter Insert design, where applicable, meets today's demand for savings in tool costs. Hanson-Whitney Adapters, to suit cutter spindle tapers, accommodate Cutter Inserts. Adapters and Cutter Insert Blanks are carried in stock to expedite delivery.

Hanson-Whitney alone offers single source product integrity — machine tools, cutting tools, and precision gages for screw threads . . . your guarantee of production perfection. Consult Hanson-Whitney engineering service in the field or at home address. Write for further information and literature —

# Hanson-Whitney

COMPANY

DIVISION OF THE WHITNEY CHAIN COMPANY  
173 BARTHOLOMEW AVE. • HARTFORD 2, CONN.  
TAPS • THREAD GAGES • HOBS • CENTERING MACHINES  
THREAD MILLING MACHINES AND CUTTERS

For more data circle 235 on Reader Service Card

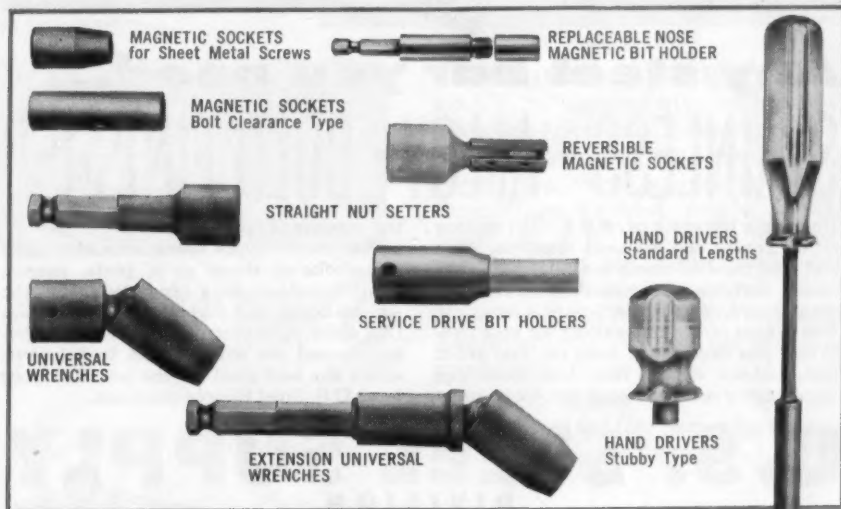
# APEX Magnetic Tools



"Like having an extra hand"—that's what operators say about Apex magnetic nut running and screwdriving tools. There's no time lost in awkward fumbling to start screws or nuts by hand. The powerful Alnico magnet in Apex fastening tools attracts and holds the screw or nut firmly in driving position, makes it easy to drive screws or run nuts at any angle—even

straight down—and in those hard-to-reach spots.

If you're not using Apex magnetic tools on your fastening operations—production or maintenance—better check right now to learn how you can make attractive savings in time and costs. Catalog 25 contains complete information; write, on your company letterhead please, for your copy.



*for the answer to your fastening problem!*

**THE APEX MACHINE & TOOL COMPANY**

1027 S. Patterson Blvd. • Dayton 2, Ohio

For more data circle 236 on Reader Service Card





## Any steel bar you need... STAINLESS • ALLOY • COLD FINISHED

Keeping a big stock of steel bars in various types, grades and sizes—in stainless, alloy and cold finished steels is a mighty big expense. And, there's no need for it. All U.S. Steel Supply warehouses\* carry a complete line of bars ready and waiting for your call. When you order steel from us, you get it fast—without delay. Why not make our warehouse your warehouse and let us carry

the expense of big inventory.

U.S. Steel Supply warehouses also carry big stocks of sheet, strip, plate, shapes, tubular products, bars, expanded metal, etc.—in stainless, and carbon and alloy steels. One order can cover all your steel requirements—and we will be glad to help you select the best steel for the job. Call your local U.S. Steel Supply salesman.

## U.S. STEEL SUPPLY DIVISION

*General Offices*  
208 So. La Salle St., Chicago 4, Ill.



\* Warehouses and Sales Offices  
Coast to Coast

**UNITED STATES STEEL**

For more data circle 237 on Reader Service Card

# PRODUCTION UP 25%

*with*  
ELECTRO-MAGNETIC  
**Magna-Lock**  
CHUCK



Magna-Lock chuck holds six tapered gibs during roughing operation.

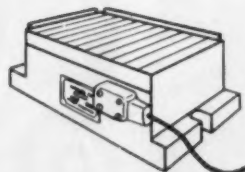
Magna-Lock chuck holds gib during finish grinding.



*Solve your holding problems with Magna-Lock. For complete information, WRITE TODAY, Dept. MM-86.*

At GISHOLT MACHINE COMPANY 24" tapered gibs are held by a Magna-Lock chuck during rough surface grinding and finishing. Pieces are rough-ground six at a time, finish-ground singly. Stock removal, .020" to .025". Spindle speed, 1200 r.p.m., table speed, 100 f.p.m. No fixture set-up time is required with the Magna-Lock chuck. There are no rejects, no scrap—production is up 25%.

This is an example of how Magna-Lock's *extra holding power* increases productivity, cuts costs.



**Hanchett MAGNA-LOCK**  
CORPORATION

BIG RAPIDS, MICHIGAN, U. S. A.

*designers and makers of a complete line of magnetic chucks and devices.*

For more data circle 238 on Reader Service Card

# Something more



# than precision ...

assures profitable production from your

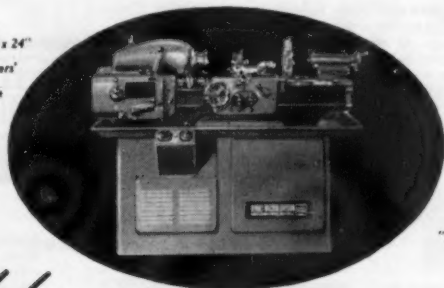
## *Hendey* Tool and Gage-Makers' Lathe

You expect precision in today's machine tool — and you get it! But, when you buy a Hendey Lathe, you get an *extra measure* of painstaking care on the part of the builders.

On the opposite page, one of our skilled machinists is checking the accuracy of the apron of a 9 in. Tool and Gage-Makers' Lathe. He has mounted the apron over a dead flat surface plate and is using a plug gage and indicator to check alignment of the holes through the apron. Accurate location of the holes is also checked in the same setup by means of a height gage and indicator. This is typical of the keen attention to detail that marks each Hendey machine.

When equipped with an electronically controlled or a magnetic amplifier drive, the Hendey 9 in. Tool and Gage-Makers' Lathe is capable of quiet, infinitely variable spindle speeds from 15 to 3000 rpm. Operator can change speeds smoothly even *during* a cut. The sensitive speed control is infinitely variable and provides full torque at low speeds. Another timesaving feature is the electric dynamic brake which will stop the spindle within two seconds, even at maximum speed. These and other exclusive Hendey features mean precision with profit for your toolroom operations and a speedy return on your investment.

Hendey 9" x 24"  
Tool and Gage-Makers'  
Lathe



"Precision with Production"

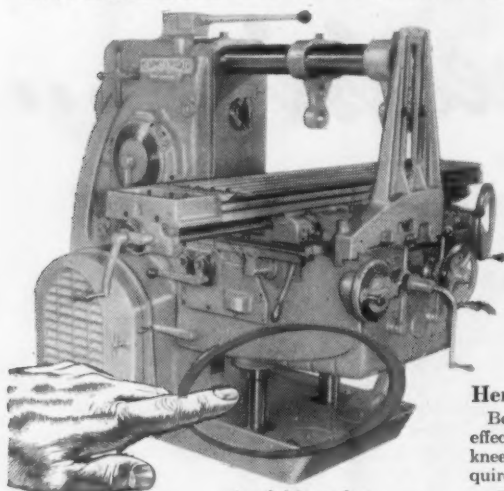
*Hendey* machine division  
BARBER-COLMAN COMPANY

84 LOOMIS ST., ROCKFORD, ILLINOIS



For more data circle 240 on Reader Service Card

# COMMON SENSE says it's better...



Available under  
Tool-Lease program

5 more reasons why **TF** Series milling machines are way out front in rigidity



**Heavier, Wider Knee** — Twin Screws support the one-piece, larger knee. Span and length of ways is increased considerably, providing greater saddle support... lasting accuracy... substantial reduction of way and gib wear.



**Three-Bearing Spindle** — Complete assembly consists of three heavy-duty bearings, flywheel, a train of wide-faced forged steel gears. Rigidity of spindle unit contributes to increased cutter life, quieter operation.



**"Vibra-Void" Overarms** — Two solid steel bars, mounted through column, void vibration at source, afford more rigidity and resistance to deflection than any other support. Design simplifies changing of arbors and cutters.



**"Front-Trol" Operation** — Front-mounted controls include feed selector, Mono-Lever table feed and rapid traverse, Automatic Cycle table feed and rapid traverse, table handwheel, saddle gib and backlash eliminator.



**Massive Column** — Solid back, double-box section column is scientifically ribbed throughout to rigidly withstand heaviest cutting forces. Full bearing column face affords maximum support for the knee. Cross-mounted motor assures maximum ventilation, easy access for routine inspection.

## Twin Screw Knee Support

Think it over... twin screw knee support is the one really new basic advancement in knee type milling machine design in years. And only Kearney & Trecker new Series machines have it!

Here's why it makes sense.

Because the *twin screw* design distributes most effectively the weight of much larger, heavier knees, saddles and tables, it fulfills today's requirements for higher speeds, feeds and power — greater machine capacity. What's more, this *balanced design* substantially increases stability under heaviest loads... offers greater resistance to torsional thrust under all cuts... divides the wear factor in half, thus assuring greater, longer-lasting accuracy.

TF Series machines are available in five sizes — No. 2 to No. 6, from 10hp to 50hp in Plain, Universal and Vertical styles.

You can get all the facts on the new TF's from your Kearney & Trecker representative, or write direct to Kearney & Trecker Corp., 6794 W. National Avenue, Milwaukee 14, Wis. Ask for Catalog TF-50.



For more data circle 241 on Reader Service Card



## surest thing in measuring—

There's never an argument when it comes to precision measuring tools. Just specify STARRETT and you'll please everyone in the shop—from the tool crib supervisor to the rawest apprentice.

But why stop with measuring tools when there are so many opportunities to get the same quality and dependability in so many other Starrett products? Did you know, for example, that Starrett makes the world's most complete line of dial indicators and

dial gages? Or that Starrett is among the largest producers of hacksaws, hole saws, band saws and band knives? Or that Starrett makes precision ground die and flat stock in over 1000 sizes?

Your Industrial Supply Distributor stocks the complete Starrett line. He can give you prompt, dependable service to match the quality and dependability of Starrett products. It pays in so many ways to specify Starrett.

### NEW CATALOG No. 27

Shows the complete Starrett line. Ask your Industrial Supply Distributor or write for free copy. Address Dept. MD, The L. S. Starrett Company, Athol, Massachusetts, U. S. A.

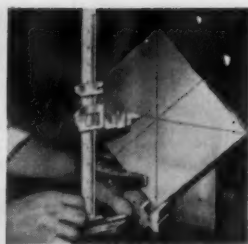


SINCE 1865  
WORLD'S GREATEST TOOLMAKERS

PRECISION HAND MEASURING TOOLS AND PRECISION PHOTOGRAPHIC  
DIAL INDICATORS • FEED TAPES • PRECISION GRINDING FLAT STOCK  
HACKSAWS • HOLE SAWS • BAND SAWS • BAND KNIVES

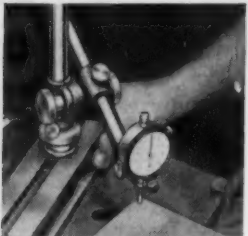


For more data circle 242 on Reader Service Card



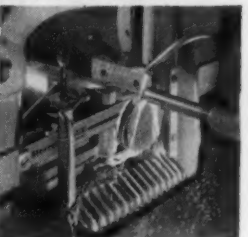
### HAND MEASURING TOOLS AND PRECISION INSTRUMENTS

The name Starrett on a tool guarantees accuracy, fine workmanship and complete dependability.



### DIAL INDICATORS AND GAGES

Standard for quality and dependability—a complete line for every gaging or production inspection application.



### HACKSAWS, BAND SAWS, BAND KNIVES

Precision made and production proved for top performance, uniformity and maximum cutting economy.



### PRECISION GROUND DIE STOCK AND FLAT STOCK

Now over 1000 sizes—air, oil, oil and water and water hardening types. "Just lay it out and saw it out."

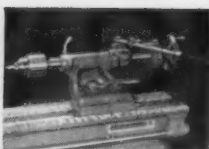




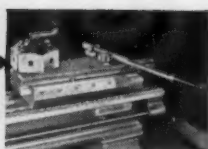
External Grinder



Milling Attachment



Handlever Tailstock



Handlever Bed Turret



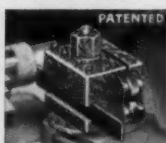
Duplex Turret Tool Holder



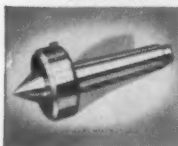
Handwheel Collet Attachment



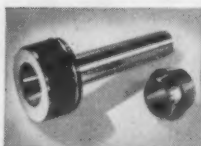
Handlever Collet Attachment



10 in 1 Tool Holder



Ball Bearing Live Center



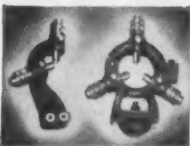
Adjustable Collet Bushing Chuck



Square Turret Tool Block



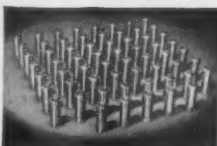
Handlever Double Tool Cross Slide



Telescoping Jaw Follower Rest and Center Rest



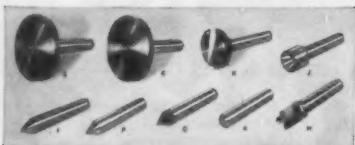
Collet Rack



Steel and Brass Collets



Step Chucks and Closers



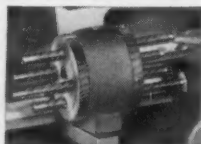
Centers and Drill Pads



Thread Indicator



Micrometer Carriage Stop



Four Position Carriage Stop



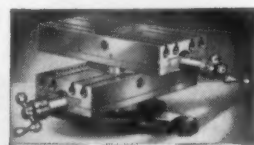
Four Position Cross Slide Stop



Dial Indicator Carriage Stop



Coolant Pump



Universal Table

## SOUTH BEND

### Lathe Attachments

- Cut Production Time
- Simplify Difficult Jobs
- Increase Lathe Versatility
- Speed Up Tooling
- Perform Special Classes of Work
- Reduce Operator Fatigue

Write for Catalog 5600

### SOUTH BEND LATHE

Building Better Tools Since 1906

SOUTH BEND 22,  
INDIANA

For more data circle 243 on Reader Service Card

# New 6" x 18" hand feed

## Thompson Grinder

FOR SHOPWORK  
OR TOOL ROOM

Completely anti-friction and permanently lubricated machine. Available with all types of attachments found on tool room surface grinders including interchangeable horizontal and vertical wheel heads. A Thompson high quality precision machine at this low price.



**LOW  
PRICE\***  
HIGH QUALITY



PRECISION PETE says:

FOR LOW COST AND QUALITY  
YOU JUST CAN'T BEAT THOMPSON  
Make your next hand feed grinder a  
Type D Thompson . . . write today for  
the new descriptive catalog, D-55



\* Write today for quotation

*Call, write or wire today*

**Thompson  
Grinders**

The Thompson Grinder Company at Springfield, Ohio

For more data circle 244 on Reader Service Card

August, 1956

modern machine shop 45

**For Accurate ULTRA-SURFACES**

not obtainable by any other finishing method, use...

## **Cogsdill Bearing-izing\* Tools**

**200,000**  
rapid-fire blows  
per minute  
from high-speed  
cam-operated  
peening rolls



\*

A proven, precision process for surface finishing and sizing of holes, concentric flat surfaces, shafts, and many other contours.

For all metals of suitable ductility the peening action of the bearing-izer displaces and condenses machined surfaces, to produce more accurate, work-hardened, corrosion resistant surfaces easily lubricated and assembled.

*Submit parts drawings  
for engineering recommendations.*



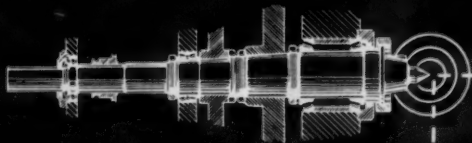
**Cogsdill TOOL PRODUCTS, INC.**

12980 W. Eight Mile Road, Oak Park 37, Michigan

For more data circle 245 on Reader Service Card

# Cincinnati Sub-ZEROing in FOR ACCURACY

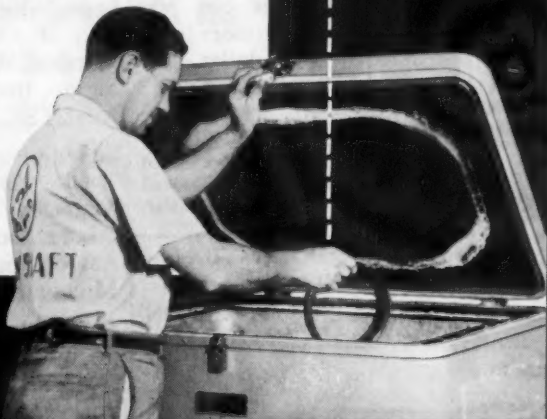
Shrink fit assembly assures maximum rigidity for spindle bearing raceways of new LeBlond 32 inch 4-bearing spindle.



To assure maximum accuracy for every turning operation, The R. K. LeBlond Machine Tool Company utilizes a Cincinnati Sub-Zero Industrial Chilling Machine in shrink fit assembly of spindle bearing raceways.

This internationally known lathe manufacturer mounts the spindles of its heavy duty lathes in precision tapered roller bearings which run in close tolerance steel raceways. Shrink fit assembly assures that raceways will fit tightly in headstock, perfectly aligned for true spindle operation. In addition to raceways, many other vital components are chilled with Cincinnati Sub-Zero equipment at R. K. LeBlond, in stabilization as well as assembly operations.

A new catalog on the complete line of Cincinnati Sub-Zero equipment for industrial and laboratory use is now available. Write for your free copy or outline your special low temperature requirements.



Spindle bearing raceway is placed in Cincinnati Sub-Zero Chilling Unit R-70-10 at LeBlond.

## Cincinnati Sub-Zero Products

GENERAL OFFICES and PLANT • 3930 S-6 Reading Rd., Cincinnati 29, Ohio

For more data circle 246 on Reader Service Card

August, 1956

modern machine shop 47

# BEST BUY because they're BALANCED

## du MONT TOOL BITS



An almost perfect balance of toughness, wear resistance and heat resistance gives



duMONT Tool Bits a definite edge in cutting life, gives you more cuts per bit, more cuts per dollar.



Clip the coupon to get full information on duMONT High Speed TOOL BITS, Ground Square and Rectangular.

The du MONT CORPORATION,  
Greenfield, Mass.

MAIL FREE Tool Bit COMPARISON  
CHART, CATALOG and PRICE LIST  
S to

Name.....

Company.....

Address.....

For more data circle 247 on Reader Service Card

48 modern machine shop

## Meetings

### Important Meeting Dates

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

**August 6-8** • Society of Automotive Engineers, Inc., National West Coast Meeting, Mark-Hopkins Hotel, San Francisco. Society headquarters: 29 W. 39th St., New York 18, New York.

**August 7-8** • National Screw Machine Products Association, National Sales Conference, Wade Park Manor Hotel, Cleveland. Association headquarters: NSMPA Building, Cleveland 20, Ohio.

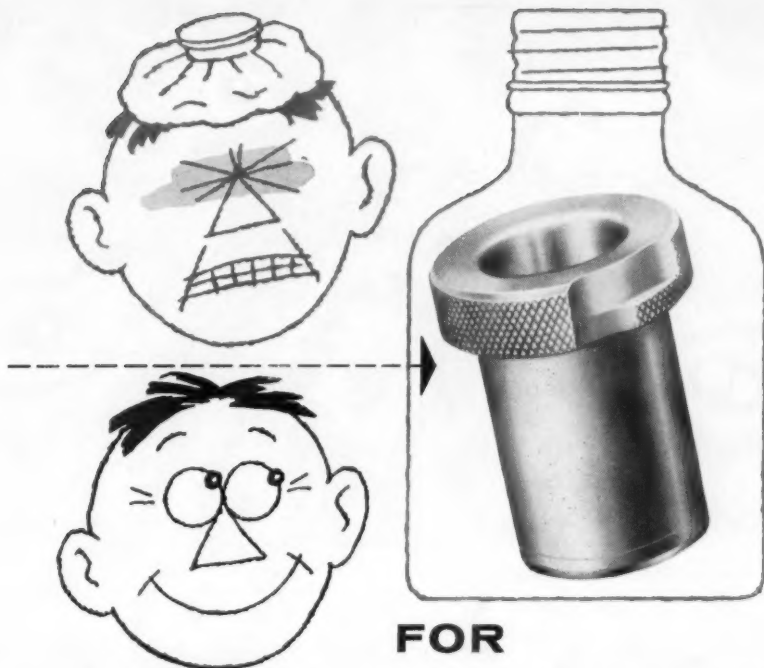
**September 7-9** • Metal Powder Association, Fall Meeting, The Homestead, Hot Springs, Va. Association headquarters: 420 Lexington Ave., New York 17, New York.

**September 9-12** • American Institute of Chemical Engineers, Fall Meeting, William Penn Hotel, Pittsburgh. Institute headquarters: 120 E. 41st St., New York 17, New York.

**September 9-12** • National Metal Trades Association, Eastern Plant Management Conference, Essex-Sussex Hotel, Spring Lake, N. J. Association headquarters: 122 S. Michigan Ave., Chicago 3, Illinois.

**September 17-20** • Instrument Society of America, International Instrument-Automation Conference and Exhibit, Coliseum, New York City. Society headquarters: 1319 Allegheny Ave., Pittsburgh 33, Pennsylvania.

August, 1956



## FOR HEADACHE RELIEF!

**DON'T CALL A DOCTOR...USE AMERICAN DRILL BUSHINGS**

Yes—for quick relief of major aches and pains, irritation due to inadequate service, and general production headaches, use American Drill Bushings. Complete stocks of American Drill Bushings are on our exclusive distributors' shelves now...ready to go to work for you at a moment's notice.

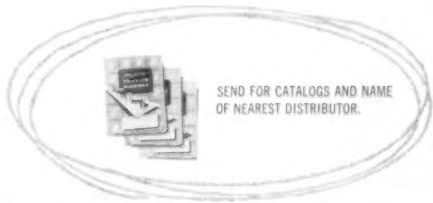
American gives instant relief with fast service that assures you of the *right* drill bushing *when you want it!*

And...American produces the finest precision drill jig bushings containing extra features such as:

Double ground lead for easy pressing into the jig • Radius into the hole—to prevent tool hang-up, wear and breakage • Two way undercut under the head to insure squareness to the jig • 100% concentricity inspection • Internal ground holes to insure straightness • Original 3-D ordering method eliminating confusing code numbers • Patented bushings for plastic tooling • Complete local stocks.

Let American relieve your drill bushing headaches. Get American Drill Bushings NOW!

*American*  
**DRILL BUSHING CO.**  
5107 PACIFIC BOULEVARD  
LOS ANGELES 58, CALIFORNIA



SEND FOR CATALOGS AND NAME  
OF NEAREST DISTRIBUTOR.

For more data circle 248 on Reader Service Card

August, 1956

modern machine shop 49





**HEAVY STOCK REMOVAL** with precision tolerance on this double spindle disc grinder is a faster, easier job when a Norton disc adds the "Touch of Gold." Norton covers the entire range of disc grinding applications, from snagging to lapping.

## "We find Norton discs outproduced others - 2 to 1"

*One of many job reports showing how  
Norton discs add the profit-boosting "TOUCH of GOLD"*

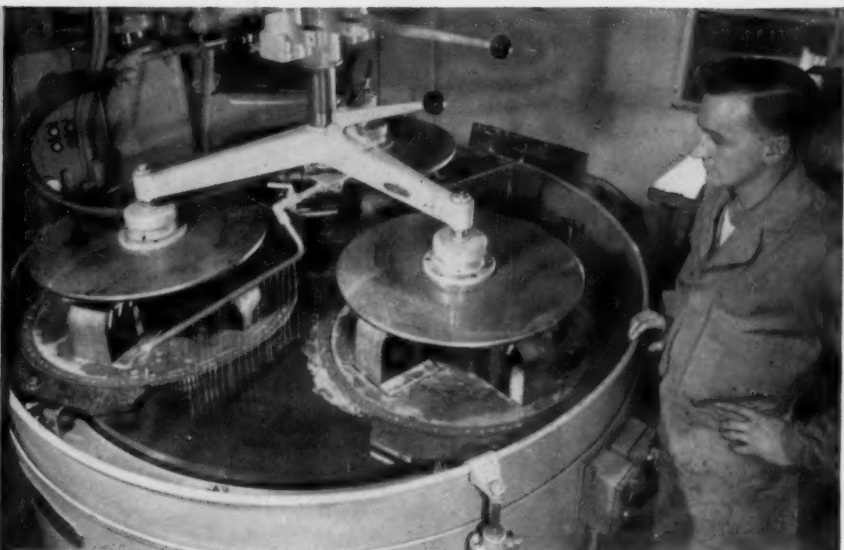
### **MORE OF THE SAME:**

● "Norton discs the best ever received. Produced over 6,000,000 piston rings — 100% more than our former discs, with 50% less dressing. Results duplicated in subsequent shipments."

● "Outlasted and outperformed all other discs. Gave 366,975 pieces without burn."

● "Averaged 21,500 pieces, a new high for this job."

W-1724



LAPPING ENDS OF TRANSFORMER COILS on a Norton 60-F HYPRO-LAP\* lapping machine equipped with a Norton disc. Only Norton offers you such long experience in both grinding wheels and grinding machines to help you produce more at lower cost.

- "High above competition for output and grinding quality."
- "Gave 20% longer service life."

What Norton discs have done for others, they can do for you.

That goes for any material you're grinding, on any type of disc grinding machine.

Norton discs of ALUNDUM\* and CRYSTOLON\* abrasives are made in all standard grit sizes, all grinding grades, five types of bonds and all types of mountings. They are precision-built for closest uniformity — so you can depend on the same cool cutting action and extra long service life every time you re-order.

#### See Your Norton Distributor

for valuable aid in selecting the right discs for your jobs. Ask him for the booklet, *Disc Grinding*. Or write to the nearest district office of NORTON COMPANY, Worcester 6, Mass. Distributors in all industrial areas,

listed under "Grinding Wheels" in your phone book, yellow pages. Behr-Manning Company, Troy, N. Y., division of Norton Company. *Export:* Norton Behr-Manning Overseas Incorporated, Worcester 6, Mass.

\*Trade-Marks Reg. U. S. Pat. Off. and Foreign Countries

**NORTON**  
A B R A S I V E S

*Making better products...*

*to make your products better*

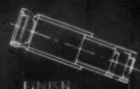
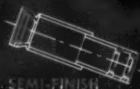
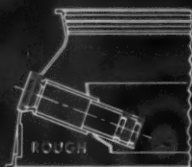
NORTON PRODUCTS: Abrasives • Grinding Wheels • Grinding Machines • Refractories

BEHR-MANNING PRODUCTS:  
Coated Abrasives • Sharpening Stones  
Behr-cat Tapes

For more data circle 250 on Reader Service Card

# Precision Bores and Faces Diffuser Cases

*Another Special by Cross*



This Two-Way Boring Machine roughs, semi-finishes and finishes the accessory drive shaft hole of Jet Engine Diffuser Cases at the rate of  $2\frac{1}{2}$  pieces per hour. The operator places the part in the work holding fixture and the rough boring cutters in the boring spindles, after which the rough boring is performed automatically. Next, the operator replaces the rough boring cutters with semi-finish boring cutters and the cycle is repeated for the semi-finish boring operation. Then, the finish boring operation is performed in a similar manner and the part is removed.

The cutters are supported in live precision bearing spindles, which are in turn supported by hardened and ground steel bushings adjacent to the work.

All cutters are pre-set for size and are quickly and easily changed for the different operations.

To provide maximum flexibility for future part design changes, the machine is built with Cross Modular "Building Block" Units.

Established 1898

THE **CROSS** CO.  
*First in Automation*  
DETROIT 7, MICHIGAN

# modern machine shop

## ADVERTISING REPRESENTATIVES

**Gene J. Schwarber, Advertising Manager**, 431 Main Street, Cincinnati 2, Ohio, MAIn 1-0182. Eastern Michigan, Missouri, Kansas.

**Duncan W. Barton**, 342 Madison Ave., New York 17, N. Y., Murray Hill 7-7390. Eastern Pennsylvania, Central New York State, New Jersey, Maryland, Delaware, Washington, D. C., Long Island, Brooklyn.

**Granville M. Fillmore, Vice President**, 342 Madison Ave., New York 17, N. Y., Murray Hill 7-7390. Eastern New York State, Connecticut, Massachusetts, Rhode Island, Vermont, New Hampshire, Maine.

**John M. Krings, Vice President**, Tribune Tower, Chicago 11, Illinois, DElaware 7-5441. Western Michigan, Illinois, Wisconsin, Iowa, Minnesota, the Dakotas, Northern Indiana.

**George E. Hay**, 431 Main Street, Cincinnati 2, Ohio, MAIn 1-0182. Western Pennsylvania, Western New York, Ohio, Kentucky, Southern Indiana.

**Norman S. Rogers**, 431 Main Street, Cincinnati 2, Ohio, MAIn 1-0182. Central Indiana.

**The Robert W. Walker Company**, 2330 West Third St., Los Angeles 5, Calif., DUUnkirk 7-4388; 57 Post St., San Francisco 4, Calif., SUtter 1-5568. California, Oregon, Washington.

★ ★ ★

**modern machine shop**  
431 Main St. Cincinnati 2, Ohio

August, 1956

# TREPPANS

- ▶ Maximum Diameter —  $\frac{5}{8}$  inch.
- ▶ For fast-production, multi-spindle machines.
- ▶ Specially heat-treated, high speed steel.
- ▶ With back taper or radial relief.
- ▶ Made by specialists in the design of small tools.



**WOODRUFF & STOKES CO.**  
INCORPORATED

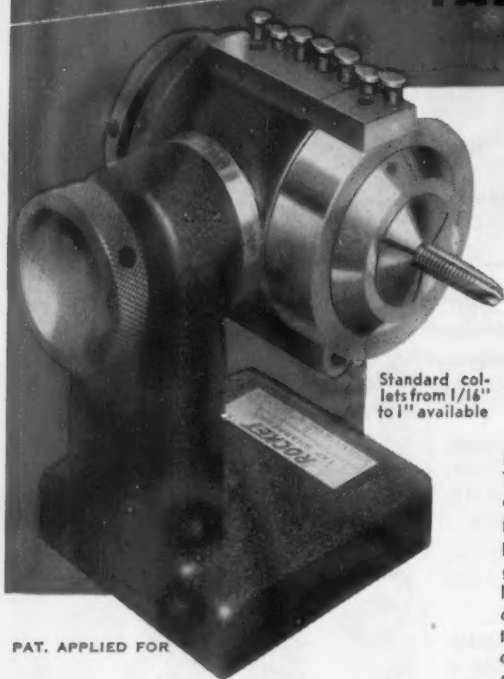
Bldg. 32, 357 Lincoln St., Hingham, Massachusetts  
For more data circle 252 on Reader Service Card

modern machine shop 53

sharpen dull taps swiftly, economically, and accurately

# THE Rocket

TAP SHARPENER



Standard col-  
lets from 1/16"  
to 1" available



*A low Cost*  
fixture that sharpens  
dull taps to like new  
condition

PAT. APPLIED FOR

There's a ROCKET sales representative in your area. We will be glad to direct him to you for a demonstration of this unit. Literature is available upon request.



**ROCKFORD DIE & TOOL WORKS, INC.**

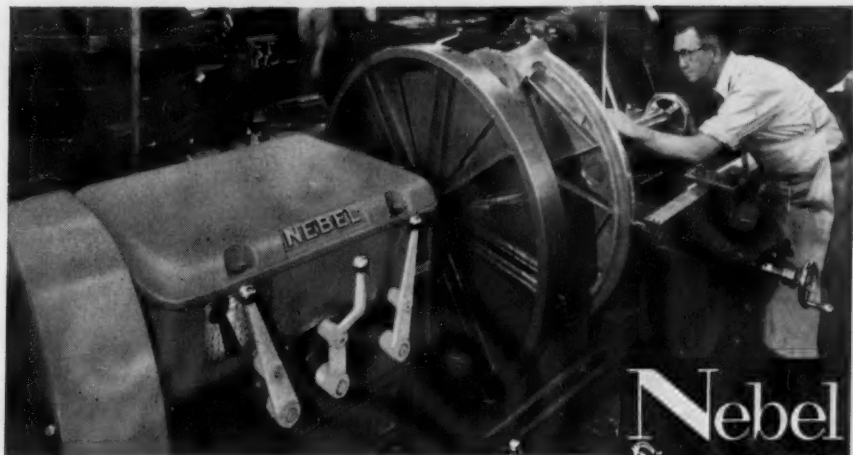
1816 Seventeenth Ave. • Rockford, Illinois

Don't dispose of dull taps! THE ROCKET TAP SHARPENER can save you many dollars in new tap investment — will pay for itself in no time at all.

Designed to do a high precision job of grinding 2, 3, or 4 flutes, right or left hand taps, straight or spiral, the ROCKET carries an unqualified company guarantee of satisfaction. It can be used on any make of tool and cutter grinder or small tool room surface grinder. Simple to operate — no maintenance.

Start reducing tap cost today — examine the ROCKET TAP SHARPENER.

For more data circle 253 on Reader Service Card



**Nebel**  
LATHES  
CINCINNATI

**10,000 hrs continuous work**  
**without maintenance attention...**

the record certified for 2 Nebel lathes by Arma Division, American Bosch Arma Corp.

■ "Our 20"/40" Nebel extension bed gap lathes meet our exacting requirements for machining large, clumsy work pieces, in production volume and with precision performance," says Mr. John M. Palmer, machine shop superintendent for Arma Division, American Bosch Arma Corp., Garden City, L. I.

"The part shown here is a hollow magnesium casting measuring 36" in diameter (irregular), 32" long with a 1/16" shell. Since each casting costs \$1,000, spoilage would be serious. Also, since magnesium is highly inflammable, safety is a vital consideration.

"However, with the wide selection of spindle speeds our Nebel lathes offer, we are able to turn these castings at exactly the right speed to achieve volume and precision (tolerance: .001"), without scrap losses and in perfect safety."

For complete information on how the flexible swing and center distance capacity of Nebel extension bed gap lathes can help reduce your production and maintenance turning costs, use convenient coupon below to request descriptive bulletins. Nebel Machine Tool Corp., 3409 Central Parkway, Cincinnati 25, Ohio.

*Gentlemen: Please send me at once and without obligation bulletins indicated:*



☐ 20"/40" AG series

☐ 20"/40" Imperial series

☐ 28"/50" 6 series

NAME \_\_\_\_\_

COMPANY \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_

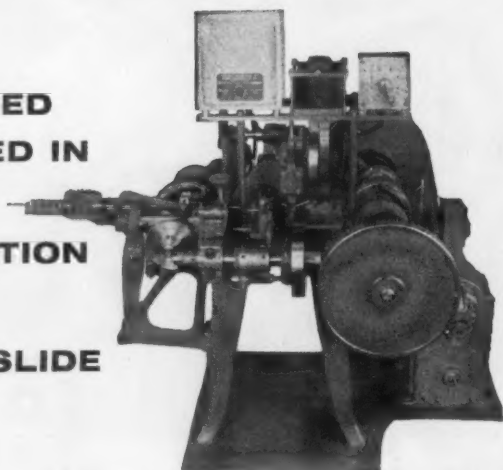
ZONE \_\_\_\_\_

STATE \_\_\_\_\_

For more data circle 254 on Reader Service Card



**WIRE FORMED  
AND WELDED IN  
ONE OPERATION  
WITH  
NILSON 4-SLIDE**



Garter loop formed and welded in one fast operation by Nilson 4-Slide.



Another example — Drapery hook is formed with two wires entering 4-Slide simultaneously and automatically welded together at point of contact.

Production is increased more than 25% by Hawie Manufacturing Company using a #1 Nilson 4-Slide with welding attachment which eliminates need for ferrule loops in the manufacture of hose supporters. .062 soft basic wire is formed with ends welded in one automatic operation at a conservative 105 pieces per minute. Additional savings are realized in eliminating cost of ferrule.

Nilson 4-Slides will produce many types of wire forms similar to the part shown here in which two pieces must be welded or otherwise closed together. By the mounting of automatic welding equipment on the 4-Slide, such parts can be produced in one fast, accurate operation at minimum cost. Nilson 4-Slide Wire Forming Machines are available in a wide range of sizes to handle basic steel wire from  $\frac{1}{32}$ " to  $\frac{1}{2}$ " diameter.



**A.H.**  
**NILSON**  
**MACHINE COMPANY**

**1514 RAILROAD AVENUE, BRIDGEPORT 5, CONN.**

Automatic Chain Making Machines • Staple Forming Machines • Wire and Stock Reels • Wire Straightening Equipment • Slide Feeds for Presses • Wire and Ribbon Stock Forming Machines

For more data circle 255 on Reader Service Card

*For better  
safer grinding*

**SIMONDS**  
ABRASIVE CO.

**Reinforced Resinoid Bonded  
ABRASIVE WHEELS**



**SIMEX<sup>®</sup>**  
**RED WHEEL**

Save time and money on weld grinding with SIMEX... lightweight, rigid, for heavy duty use. Structurally different—with auto tire cord safety web backing! Send for Bulletin ESA-244.



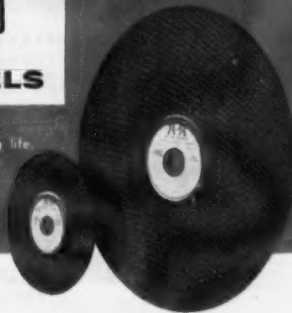
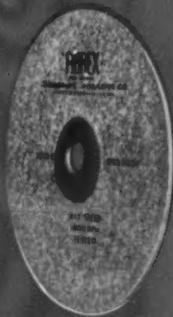
**FIBREX<sup>®</sup>**  
**RED CENTER WHEELS**

Ideal for deburring, finishing, polishing and cutting-off. Slightly flexible for general offhand use and the lighter weld grinding jobs. Extra strong and fast cutting. Send for Bulletin ESA-244.



**DOUBLE**  
**CUT-OFF WHEELS**

Glass fiber reinforced for extra strength, less breakage and long life. Fast cutting on all types of metals and non-metals. Send for Bulletin ESA-243.



**CALL YOUR SIMONDS  
DISTRIBUTOR**



**LOCAL STOCK  
FAST SERVICE**

**SIMONDS ABRASIVE COMPANY • PHILADELPHIA 37, PA.**

Division of Simonds Saw and Steel Co., Fitchburg, Mass.

# Now...Free



## New SLIDE GUIDE

With this new and different slide rule type comparison chart you can check 21 essential specifications of 8 leading heavy duty milling machines. Compare their capacity, speeds, feeds, etc., at a glance.

Just fill in the coupon, and mail the entire ad for your FREE copy.

"MAIL  
ENTIRE  
AD TODAY!"



GREAVES MACHINE TOOL COMPANY  
2700 Eastern Avenue, Cincinnati 2, Ohio  
Send me my FREE copy of the "Slide-Guide"

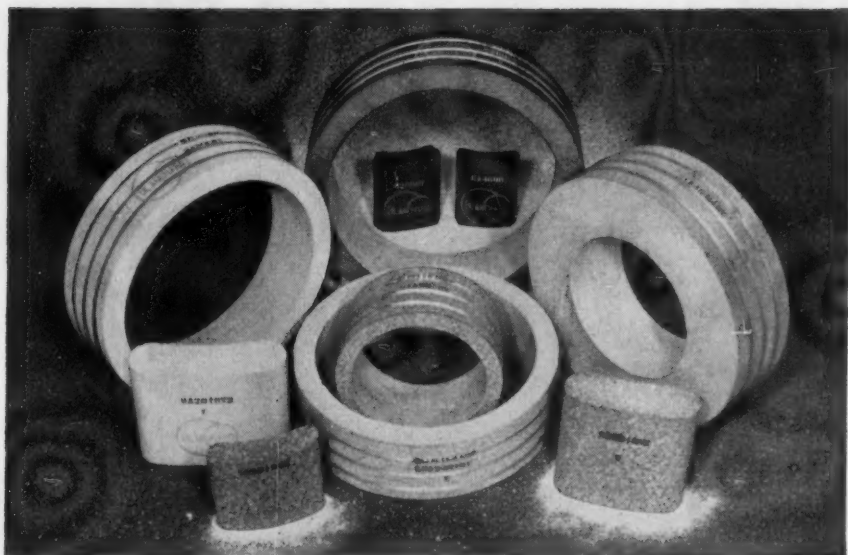
Name \_\_\_\_\_ Title \_\_\_\_\_

Firm \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_

For more data circle 257 on Reader Service Card



## Here's why Blanchard Wheels are best for Blanchard grinding

Almost thirty years ago, Blanchard began developing and manufacturing better grinding wheels for Blanchard Surface Grinders. Our research first produced silicate bonded wheels, and then resinoid bonded wheels.

Today, Blanchard offers silicate, resinoid and vitrified bonded wheels . . . scientifically manufactured and accurately graded in our modern wheel plant.

Use Blanchard Wheels on your Blanchard Grinders. The correct wheel gives you peak production and economy on each job . . . whether the work is tough as copper or fragile as glass, whether it requires heavy roughing cuts or precision grinding within .000010" of absolute flatness and surface finish of 1 micro-inch.

PUT IT ON THE **BLANCHARD**

**THE BLANCHARD MACHINE COMPANY**

64 STATE ST., CAMBRIDGE 39, MASS., U. S. A.

**THE BLANCHARD MACHINE COMPANY** 64 State St., Cambridge 39, Mass.

MMS

Please send "The Art of Blanchard Surface Grinding" (3rd Ed.)

NAME \_\_\_\_\_

STREET \_\_\_\_\_

FIRM \_\_\_\_\_

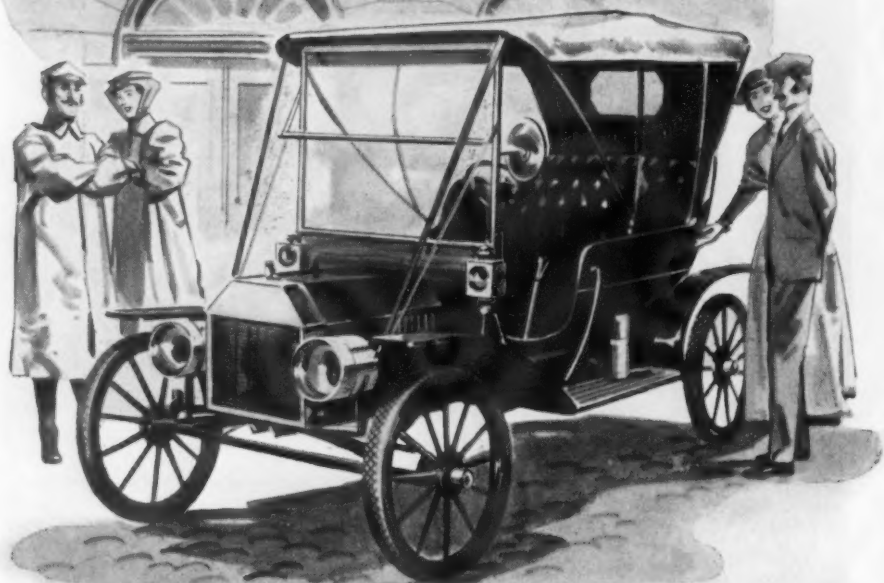
CITY \_\_\_\_\_ ZONE \_\_\_\_\_ STATE \_\_\_\_\_

For more data circle 258 on Reader Service Card

August, 1956

modern machine shop 59

1910 Our 46th Anniversary 1956



## WHEEL TRUEING TOOL COMPANY

92-3200 W. DAVISON AVE., DETROIT 38, MICHIGAN

ESTABLISHED 1910

Southwestern Plant: Dallas, Texas

Distributors in Principal U.S. Cities—Agents Throughout the World



Radius  
Forming  
Tools



"Tru-Line"  
Profile  
Dressing  
Tools



Diamond  
Grit Tools  
for Thread  
Dressing



"Tru-Thread"  
Thread  
Dressing  
Tools



## the 20 horsepower miracle

Pioneering was fashionable in Detroit 46 years ago and we, with our pioneer idea of expertly selected industrial diamonds, had lots of company and customers among the new car and truck builders who were springing up at the average (and incredible) rate of half-a-dozen a month.

And, if we needed inspiration and encouragement in our early business years (and sometimes we did) it was right at hand in the social and industrial miracle of one little car that had been launched with an idea just as pioneering as our own.

Until then, horseless carriages had been for the rich. This car was for the common man. It was light, simple, cheap (\$1100 for the Town Car in 1910; \$260 for the Roadster in 1924) and—indomitable. With a spunky little four cylinder, 20 horsepower engine, it performed impossible feats of transportation and endurance.

Originally, production had been hopefully set at 25,000 cars for the year but in the twenty years of its existence, more than 15,000,000 were built and they changed the pattern of daily life all over the world.

Cars have changed vastly in our time and so have diamond tools, and we have seen our pioneer idea of *expertly selected industrial diamonds* and *Engineered Diamond Tools\** become the accepted principle throughout industry simply because they do their job better and at less cost.

*\*Engineered Diamond Tools means diamond tools engineered to the job and guaranteed to do it.*

### WHEEL TRUEING TOOL COMPANY OF NEW JERSEY

33 West Street, Bloomfield, N. J.

### WHEEL TRUEING TOOL COMPANY OF CALIFORNIA

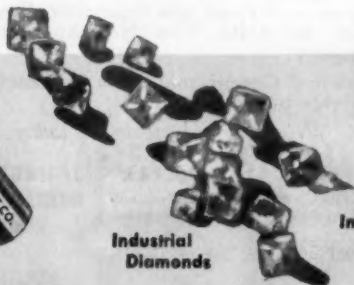
5560 Alhambra Ave., Los Angeles 32, California

### WHEEL TRUEING TOOL COMPANY OF CANADA, LTD.

575 Langlois Ave., Windsor, Ont.



Standard  
Dressing  
Tools



Industrial  
Diamonds



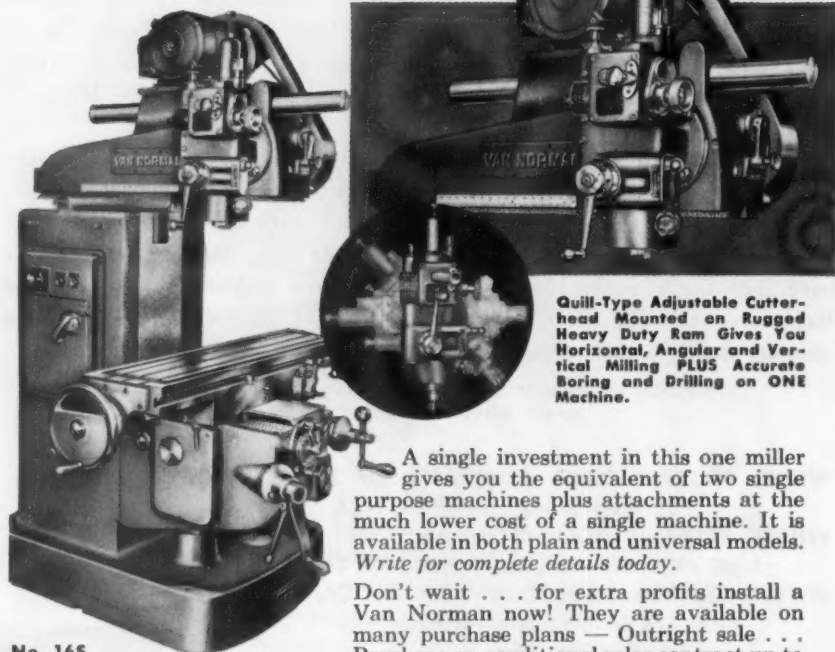
Impregnated  
Dressing  
Tools



# NEW VAN NORMAN NO. 16S RAM TYPE MILLER

with the Quill-Type Adjustable Cutterhead

Gives you MORE VERSATILITY  
PLUS MORE CUTABILITY than  
Single Purpose Machines



Quill-Type Adjustable Cutterhead Mounted on Rugged Heavy Duty Ram Gives You Horizontal, Angular and Vertical Milling PLUS Accurate Boring and Drilling on ONE Machine.

A single investment in this one miller gives you the equivalent of two single purpose machines plus attachments at the much lower cost of a single machine. It is available in both plain and universal models. Write for complete details today.

Don't wait . . . for extra profits install a Van Norman now! They are available on many purchase plans — Outright sale . . . Purchase on conditional sales contract up to 5 years . . . Pay as you depreciate. See your dealer or write Van Norman Machine Company.

Lease and Conditional Sales Contracts not available to Export.

Write for complete details today.

## No. 16S

Quill Travel: 4"

Quill Power Feed: .0015; .003; .006

22" Power feed to table

Cutterhead Spindle Motor: 2 HP

You can own this machine for as little as \$4.98 per day

## VAN NORMAN MACHINE COMPANY

MANUFACTURERS OF — Ram and Column Type Milling Machines, Cylindrical Grinders, Spline and Gear Grinders, Oscillating Radius Grinders, Special Production Grinders, Centerless Grinders.

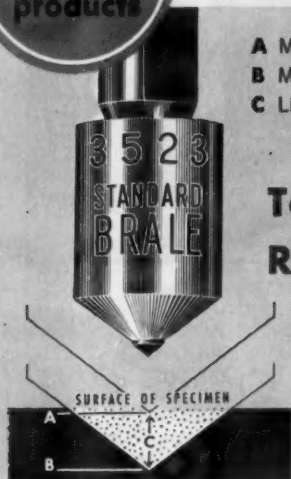
SPRINGFIELD 7,  
MASSACHUSETTS

For more data circle 261 on Reader Service Card



# Wilson Diamond "Brale"\* Penetrators

- A Minor load penetration
- B Major load penetration
- C Linear measurement of penetration increase



To be **SURE** of your  
**ROCKWELL\*** hardness test  
use only a  
**WILSON "BRALE"**  
Penetrator

• WILSON Diamond "Brale" Penetrators are precision ground under high magnification to assure mathematical and microscopic accuracy. This meticulous attention to manufacturing detail, provides the extreme accuracy demanded of an instrument where the difference between a single degree of "ROCKWELL" reading is but 0.00008" penetration. N "Brale" Penetrators are supplied for use with WILSON "ROCKWELL" Superficial Testers.

*A WILSON expert on hardness testing is never more than a few hours away. Prompt WILSON service guarantees top performance from WILSON equipment.*

\*Trademark registered

**A Full Line  
to Meet Every  
Hardness Testing  
Requirement**

Fully automatic

•

Semi-automatic

•

Superficial

•

Tukon

Micro & Macro  
Hardness Testers

**ACCO**



**Wilson Mechanical Instrument Division  
AMERICAN CHAIN & CABLE**

230-G Park Avenue, New York 17, N. Y.

For more data circle 262 on Reader Service Card

August, 1956

modern machine shop 63



these  
record-  
slashing  
**KLING**  
**SHEARS**

are winning . . .

"Production  
in plant after plant

"Labor costs cut 75%"

"Getting 16 hrs. work  
from 8-hr. shift"

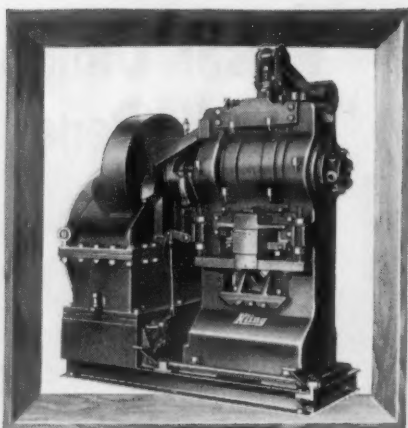
It's "shear magic," the way Kling Shears are cutting costs and speeding production in plant after plant. Today the opportunities for winning Production Oscars with Kling Shears in your plant are greater than ever. Constant Kling performance improvements make it easier than ever! Take these Kling Guillotine Shears, for example. They're completely redesigned to assure you an even wider range of capacities and still sturdier construction.

Since 1892

**Kling**

For more data circle 263 on Reader Service Card

64 modern machine shop



KLING  
GUILLOTINE SHEARS  
available in 6 sizes



Oscars"



Double Angle  
Shears



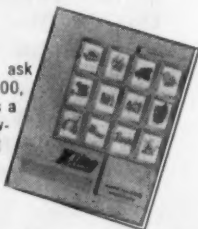
Rotary Shears



Combination Shear,  
Punch & Coper

Fully-enclosed power drive and speed reduction unit... high tensile strength ductile frame on shear unit ... new type guarding ... are typical of Kling's topnotch engineering. Send for data bulletins on the particular Kling Shear which best suits your requirements.

If you prefer, ask for Bulletin 100, which contains a complete showing of Kling Metal Working Machines



Active Kling Distributors cover practically every marketing area of U.S. and Canada. Write us for name of one nearest you.

1408MM

**BROS. ENGINEERING WORKS**

1320 N. KOSTNER AVE.

CHICAGO 51, ILLINOIS

Exclusive Canadian Distributor: Brown-Beggs Foundry & Machine Co. Ltd., Hamilton, Ont.

Export Distributor: Simmons Machine Tool Corp., 50 E. 42nd Street, New York 17, N. Y.

August, 1956

# FLEXIBILITY—PLUS!

THE

## Oliver

FACE MILL GRINDER

- TRULY—THE MOST UNIVERSAL FACE MILL GRINDER AVAILABLE.
- DESIGNED SPECIFICALLY FOR THOSE "HARD TO GRIND" CLOSE PITCH CUTTERS. EQUALLY EFFICIENT FOR OTHER FACE MILLS, SIDE MILLS, CHANNEL MILLS, ETC.
- UNIVERSAL ADJUSTMENTS INCLUDE:



CAPACITY—4" TO 24" DIA. MILLS

- \* Cross carriage travel  $\longleftrightarrow$  5" either side of center
- \* Horizontal travel of grinding unit  $\longleftrightarrow$  7"
- \* Maximum travel of base table  $\longleftrightarrow$  20"
- \* Angular adjustment of wheel spindle head  $\curvearrowright$  180°
- \* Angular adjustment of work spindle  $\curvearrowright$  180°
- \* Swivel adjustment of work spindle  $\bigcirc$  360°
- \* Maximum elevation of work spindle 115°
- \* Vertical adjustment of wheel spindle  $\updownarrow$  1½"
- SET-UP IS ASTOUNDINGLY SIMPLE REGARDLESS OF ANY COMBINATION OF POSITIVE OR NEGATIVE RAKE ANGLES ON EITHER THE RADIAL OR AXIAL DIMENSIONS.

The Oliver line also includes the Hydraulic Automatic Face Mill Grinder and the #2 Arc Radius Cutter Grinder.

## Oliver

INSTRUMENT  
• COMPANY

1430 EAST MAUMEE



ADRIAN, MICHIGAN

FACE MILL GRINDERS • AUTOMATIC DRILL GRINDERS • DIE MAKING MACHINES  
TOOL & CUTTER GRINDERS • DRILL POINT THINNERS • TEMPLATE TOOL GRINDERS

For more data circle 264 on Reader Service Card

August, 1956

modern machine shop 65

**ACE**

Bats

in any league!

**ACE** the "BIG-LEAGUER"

in **DRILL BUSHINGS!**

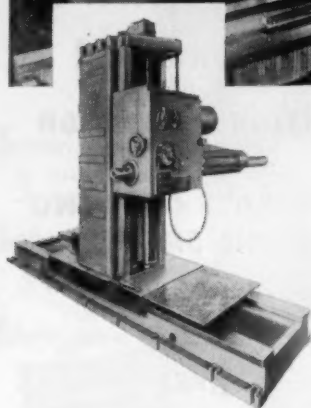
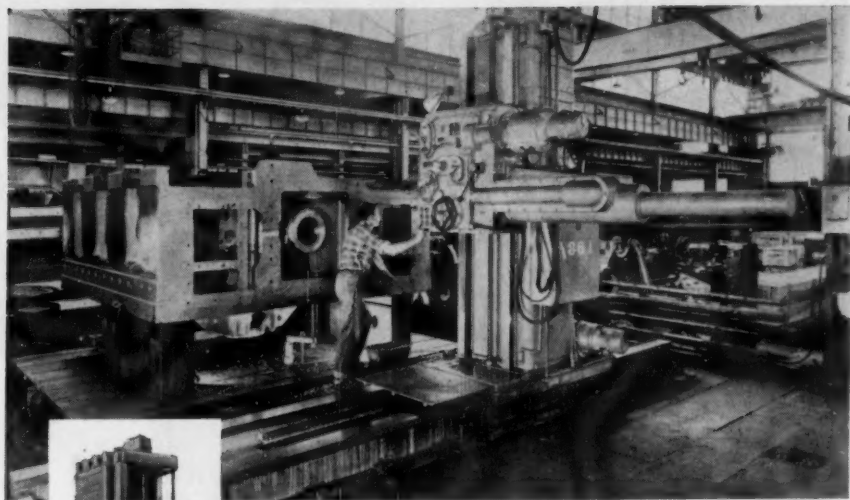
QUALITY  
ACCURACY  
LARGEST DELIVERABLE STOCKS ANYWHERE

Write today for the all-new  
1956 catalog containing  
Technical Data, Comparison  
Tables, Price Lists and Name  
of Dealer in your area.



**ACE DRILL BUSHING CO., INC.**  
5407 Fountain Ave., Los Angeles 29, Calif.

For more data circle 265 on Reader Service Card



**A JOB THAT ONLY**

**A *Kaukauna***

**HORIZONTAL DRILLING, TAPPING AND BORING MACHINE**

**CAN DO—*faster, easier,*  
*at lower production cost***

A leading manufacturer of heavy duty earth moving equipment installed a single Kaukauna Model 3040 Drilling Machine and secured far more production work than from the three drilling machines it replaced. Since the original installation, four more machines have been purchased for other plants.

Time and labor savings are tremendous. A majority of the operations are drilling and tapping the roller frames and main frames of large cranes, and boring large holes for the boom pin and bearings in the frame itself. Many of these bores are 6 inches and 7 inches in diameter and require the use of extension bars to line bore the necessary holes.

The extreme rigidity and power of the Model 3040

enable these operations to be performed more quickly than with the usual drilling machines and greatly reduce the amount of crane time and setup time formerly required. Stub-boring operations are also performed easily and quickly due to the accuracy and ease of positioning; floor space is greatly reduced because the Kaukauna has sufficient horizontal travel to cover the entire part; handling and setup time have been cut radically. In addition, the variety of speeds and feeds enables the operator to change quickly from large to small drilling operations with the least amount of idle time.

**Learn now** what a Kaukauna will do for you by time estimates on your various jobs. Consult your nearest Kaukauna distributor, or phone, wire or write direct.



**KAUKAUNA MACHINE & FOUNDRY DIVISION**

**GIDDINGS & LEWIS MACHINE TOOL COMPANY**

KAUKAUNA, WISCONSIN, U.S.A.

TELEPHONE ROCKWELL 6-4631

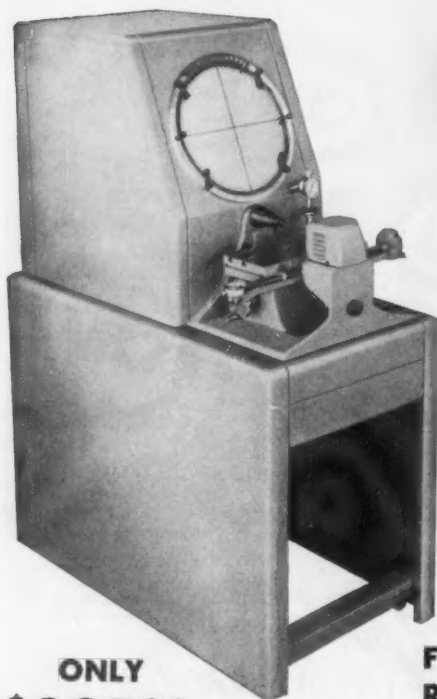
CABLE KAUMACH

For more data circle 266 on Reader Service Card

August, 1956

modern machine shop 67





# **OVEL** *Optical* **COMPARATOR**

**New, low-priced  
contour projector for  
quick, economical  
precision inspection**

**ONLY  
\$985<sup>00</sup>**

**FOR ACCURATE CHECKING  
RIGHT IN THE SHOP**

Large work capacity, sturdy, precision construction and optic arrangement which permits use in bright light in the shop. Ideal for shops using mechanical measuring methods because they haven't been able to afford the luxury of an optical comparator.

**SEND TODAY FOR  
DESCRIPTIVE BULLETIN No. 86**



## **OVEL MANUFACTURING COMPANY**

**BENTON HARBOR, MICHIGAN**

For more data circle 267 on Reader Service Card

# For your complete power CHUCKING REQUIREMENTS—specify **Logan**

**Logan** gives you

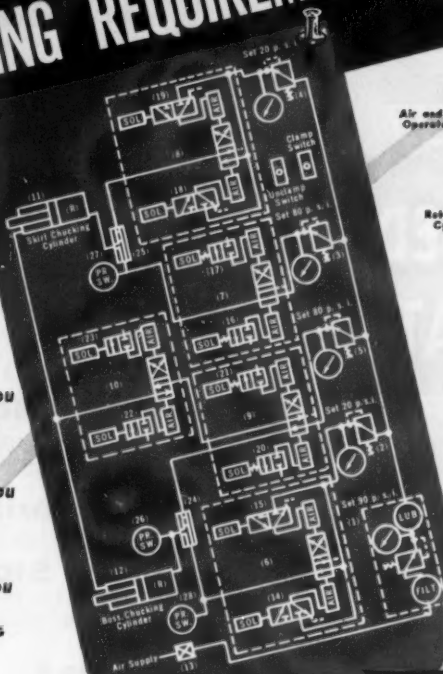
**1 MANUFACTURER RESPONSIBILITY**

**Logan** gives you

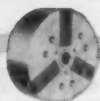
**1 ORDER PURCHASING**

**Logan** gives you

**1 SOURCE MANUFACTURING**



Air and Hydraulic Operated Chucks



Rotating Air Cylinders



Air Valve



R.F.L. Unit



Electric-operated Air Valves



Write for FREE copy of "Circuit Rider" booklet. It explains the above circuit plus many others.



YOUR DEPENDABLE SINGLE SOURCE FOR ALL AIR AND HYDRAULIC EQUIPMENT

MEMBER  
Natl. Mach. Tool  
Builders' Assn.,  
Natl. Fluid Power  
Assn.

## Logan

PROPERLY DESIGNED — PROPERLY EQUIPPED

**LOGANSPOUT MACHINE CO., INC.**  
801 CENTER AVENUE, LOGANSPOUT, INDIANA

**PLEASE SEND COPY OF CATALOG:**

- |  |  |
|--|--|
| <input type="checkbox"/> 100-1 AIR CYLINDERS           | <input type="checkbox"/> 67 SURE-FLOW PUMPS              |
| <input type="checkbox"/> 100-2 MILL-TYPE AIR CYLS.     | <input type="checkbox"/> 200-1 HYD. POWER UNITS          |
| <input type="checkbox"/> 100-3 AIR-DRAULIC CYLS.       | <input type="checkbox"/> 200-2 ROTOCAST HYD. CYLINDERS   |
| <input type="checkbox"/> 100-4 AIR VALVES              | <input type="checkbox"/> 200-3 750 SERIES HYD. CYLINDERS |
| <input type="checkbox"/> 100-5 LOGANSQUARE CYLINDERS   | <input type="checkbox"/> 200-4 HYD. VALVES               |
| <input type="checkbox"/> 100-5-1 ULTRAMATION CYLINDERS | <input type="checkbox"/> 200-5 FITTINGS                  |
| <input type="checkbox"/> S1 PRESSES                    | <input type="checkbox"/> 70-1 CHUCKS                     |
| <input type="checkbox"/> FACTS OF LIFE                 | <input type="checkbox"/> ABC BOOKLET                     |
|  | <input type="checkbox"/> CIRCUIT RIDER                   |

**TO:**

NAME \_\_\_\_\_ TITLE \_\_\_\_\_

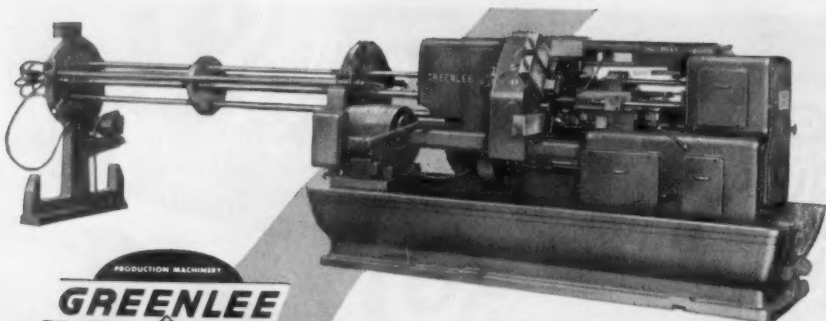
COMPANY \_\_\_\_\_

ADDRESS \_\_\_\_\_

For more data circle 268 on Reader Service Card

August, 1956

modern machine shop 69



PRODUCTION MACHINERY  
**GREENLEE**

# AIR-FEED AUTOMATIC



Write today for Catalog A-405, or better still, have the Greenlee man call and show you the way to more profitable production with this machine.

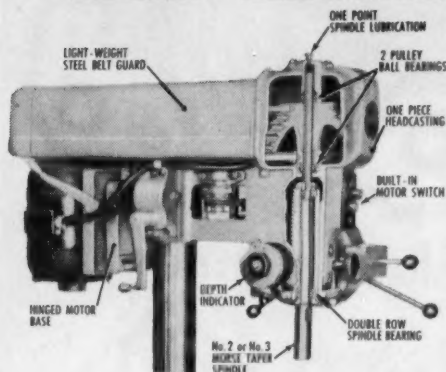
- 1 Permits Greater Job Versatility
- 2 Easily Adapted To Multiple Feedouts
- 3 Provides Longer Stock Feedout
- 4 Eliminates Stock Scoring
- 5 Reduces Stock Reel Noise
- 6 Eliminates Stock Pushers
- 7 Eliminates Feedout Cams



**GREENLEE  
BROS. & CO.**  
1888 MASON AVE.  
Rockford,  
Illinois

For more data circle 269 on Reader Service Card

# WALKER-TURNER



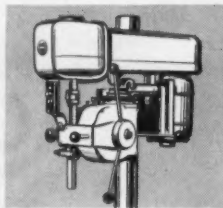
**Here's the inside story of fast, accurate production!**

The features you see here add up to unusually fine engineering — the kind you normally find only on heavy, expensive drill presses. But Walker-Turner's 20" press gives you the combination you want — high production rate, at low initial cost.

You can have this W-T 20" Drill Press with hand feed or power feed — in bench or floor models; you can set it up in any number of multiple spindles.

**1100 Series — Walker-Turner "Light-Heavyweight" 20" Drill Press: 6"**

spindle travel. 10 spline manganese steel spindle. Unusually wide range of speeds — 260 to 2600 rpm, with 1140 rpm motor. Capacity to 1" in cast iron.



Ask your Walker-Turner Distributor to show you what this husky drill press can do for you. He's listed under "Tools" in your phone book's Yellow Pages. Or write for his name and we'll send full descriptions.

DRILL PRESSES, HAND AND POWER FEED — AIR FEED DRILL PRESS ATTACHMENT  
RADIAL DRILLS — WOOD AND METAL CUTTING BAND SAWS — TILTING ARBOR SAWS  
RADIAL SAWS — JIG SAWS — CUT-OFF SAWS — LATHES — SPINDLE SHAPERS  
JOINTERS — BELT AND DISC SURFACERS — FLEXIBLE SHAFT MACHINES



## WALKER-TURNER

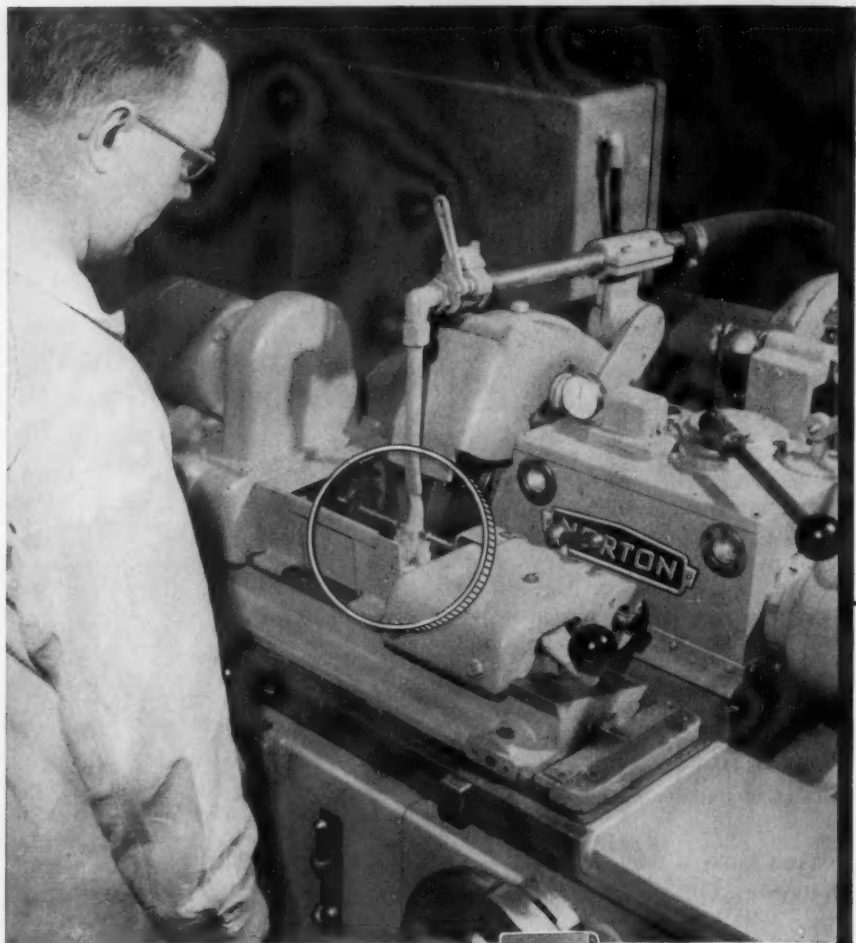
INCORPORATED

PLAINFIELD, N. J.

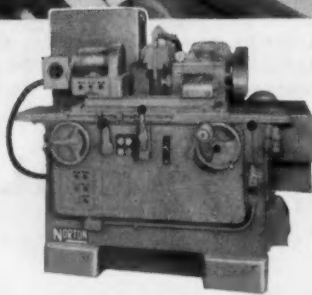
For more data circle 270 on Reader Service Card

August, 1956

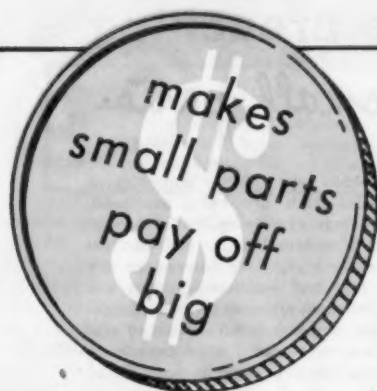
modern machine shop 71



**HIGH PRECISION PLUS HIGH PRODUCTION.** Long-lasting accuracy is built into the 4" x 18" Type CTU cylindrical grinder — together with many Norton "Touch of Gold" features that reduce operators' duties and speed production. Remember: only Norton offers you such long experience in both grinding machines and grinding wheels to help you produce more at lower cost.



# Norton 4" x 18" Type CTU cylindrical grinder



Here's a cylindrical grinder you can get as either a Plain Machine for traverse work, or as a Semiautomatic for plunge operations.

Either way you get faster, more accurate, more profitable grinding of a wide variety of small parts. Because either way the 4" Type CTU's Norton-developed features bring a new ease of operation for your men — and a new high in production quality and quantity for you.

For example, there's the extremely rugged wheel spindle unit that assures enduring precision in jobs ranging from heavy stock removal to fine finishing. Then there are optional profit-boosting extras like the new SWIVALIGN Dual Electric Indicator for measuring swivel table adjustment, and an Automatic Wheel Truing Device.

## Get All the Facts

on how this fast, accurate grinder can add the profit-boosting "Touch of Gold" to your grinding operations. See your Norton Representative, or write direct for Catalog No. 531. And ask about the Norton Lease and Purchase Financing Plans that enable you to modernize while conserving your capital. NORTON COMPANY, Machine Division, Worcester 6, Mass.



To Economize, Modernize with NEW



GRINDERS and LAPPERS

District Offices: Worcester; Hartford; New York Area; Teterboro, New Jersey; Cleveland; Chicago; Detroit  
In Canada: J. H. Ryder Machinery Co., Ltd., Toronto 5, Ontario

*Making better products...  
to make your products better*

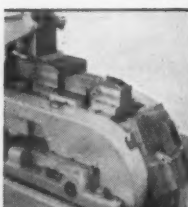
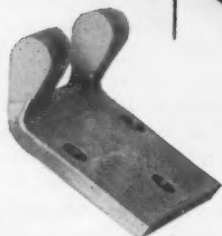
NORTON PRODUCTS: Abrasives • Grinding Wheels • Grinding Machines • Refractories  
BEHR-MANNING PRODUCTS: Coated Abrasives • Sharpening Stones • Behr-cat Tapes

For more data circle 272 on Reader Service Card

August, 1956

modern machine shop 73





■ Holding fixtures are designed for quick, convenient loading, with automatic clamping and unclamping.



**lower cost**  
*per piece with*  
**surface broaching**  
*of small parts*

■ In many plants where large quantities of duplicate metal parts are being machined, substantial savings are being made through the adoption of surface broaching. Production is exceptionally high, close tolerances are maintained, and tool maintenance costs are much lower than with ordinary methods. Foote-Burt engineers, pioneers in this advanced machining method, have had a wide experience in applying surface broaching in many fields.

**THE FOOTE-BURT COMPANY**  
Cleveland 8, Ohio

Detroit Office: General Motors Building

*Engineered for production*

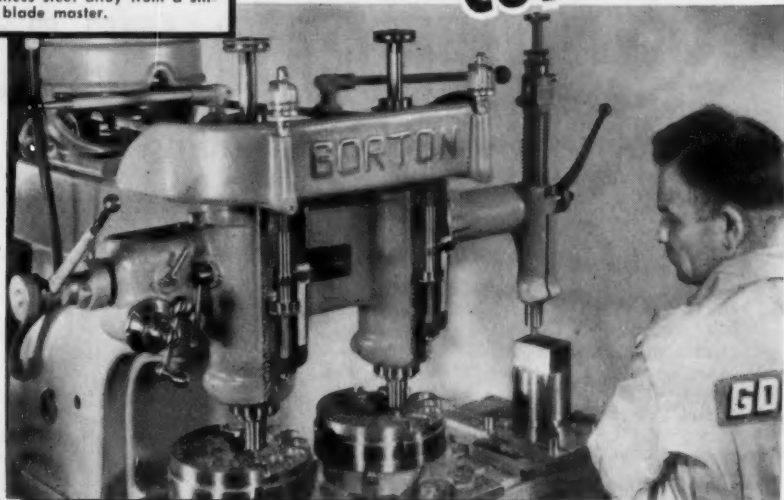
**FOOTBURT**  
**PIONEERS IN SURFACE BROACHING**

For more data circle 273 on Reader Service Card

## MULTIPLE SPINDLES...

# SAVE TIME; CUT COSTS!

Illustration shows Twin Spindle Gorton Duplicator profiling 15 blades on two impeller rings of stainless steel alloy from a single blade master.



### Multiple Milling Heads Multiply Output!

Gorton Twin Spindle Duplicators — manually controlled (shown above) or up to 6 Spindles hydraulically controlled, boost individual machine productivity.

A wide range of spindle speeds—up to 12,000 R.P.M. . . . for either high speed steel or carbide cutters. Gorton Super-Speed Vertical Mills and Duplicators are ideal for vertical milling, inside or outside profiling, die sinking, mold cutting, counterboring, chamfering, grooving and for general duplicating in ferrous and non-ferrous metals as well as plastics. Work pieces may be flat, cylindrical, spherical, square, uniformly curved or irregular in shape. Standard models or custom designed — Gorton Tracer controlled Duplicators fill many present day needs for more production at lower costs.



### SPINDLE SPEEDS UP TO 12,000 R.P.M.

- 10 Models Super-Speed Vertical Mills
- 7 Models quickly convertible for Duplicating or Milling.
- Horsepower from 1/2 to 15.

Gorton offers to supervisors and department heads a full-color and sound 16mm film — "Tracer Control in Action", showing Multiple Spindle Milling applications. Write for complete information.

Write for condensed General catalog 1655-1708—no obligation.



**GEORGE GORTON MACHINE CO.**

1708 RACINE STREET

RACINE, WISCONSIN

SINCE 1893

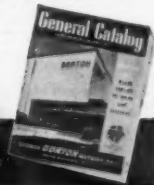
Tracer-Controlled Pantographs, Duplicators—standard and special... Horizontal and Vertical Mills, Swiss-Type Screw Machines, Tool Grinders, Small Tools and Accessories.

For more data circle 274 on Reader Service Card

A 8894-1PA

August, 1956

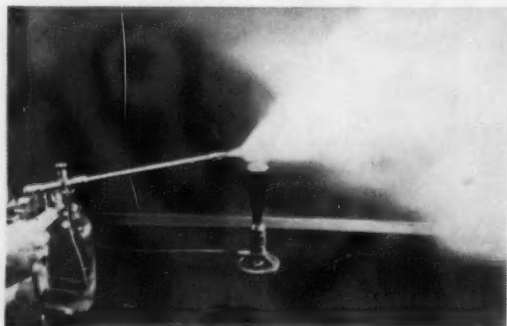
modern machine shop 75



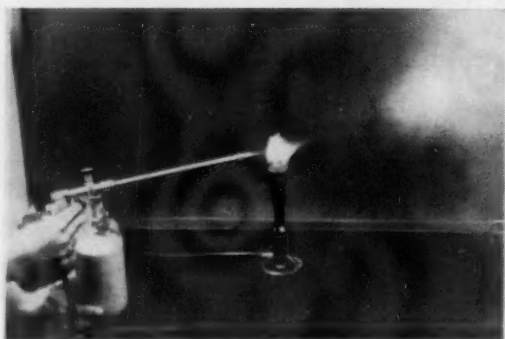
# Announcing...the First HYDRAULIC

Flame tests prove its fire-snuffing ability

This photo shows the instant combustion taking place when a conventional hydraulic oil of mineral oil type is atomized over a Bunsen burner.



In this photo, Shell Irus Fluid 902 replaces the mineral oil. Note that there is no ignition.

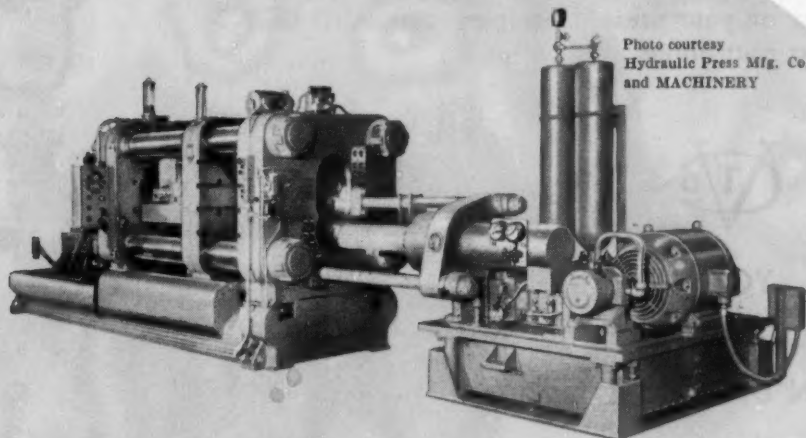


## SHELL IRUS FLUID 902

# Oil-Base fire-resistant

## FLUID

## SHELL IRUS FLUID 902



AFTER three years of intensive research, field application and evaluation, Shell Irus Fluid 902 is now commercially available for use in industrial hydraulic systems. While its cost is far lower than other fire-resistant fluids, its performance is comparable.

**No major modification of equipment is necessary.** Shell Irus Fluid 902 is a special formulation containing no corrosive ingredients . . . no adverse effect

on seals or fittings. It is a direct replacement for hydraulic oils now in service.

**Noncorrosive**, and nonrusting. Steel and copper panels immersed in Irus Fluid 902 for one week at 160°F have shown no significant signs of corrosion. Rusting has not been a problem in long-continued field tests.

This is an efficient fire-snuffing hydraulic fluid that can be widely used. Send coupon for details.

### SHELL OIL COMPANY

50 WEST 50TH STREET, NEW YORK 30, NEW YORK  
100 BUSH STREET SAN FRANCISCO 6, CALIFORNIA



SHELL OIL COMPANY  
50 West 50th St. or 100 Bush St.  
New York 20, N.Y. San Francisco 6, Cal.  
Please send me test data and information  
on Shell Irus Fluid 902.

Name

Company

Address

For more data circle 276 on Reader Service Card

# Holes **JIG GROUND** with *Vulcanaire*

Provide yourself with this inexpensive\* instrument for use on your present equipment and JIG GRIND with a guarantee.



**YOUR  
TOOL ROOM  
IN DAYTON  
45th YEAR**



A five station indexing fixture from Vulcan's Contract Tool Room (Your tool room in Dayton).

Using a jig borer index table with the Vulcanaire 5 indexing holes and 35 locating and clamping holes were JIG GROUND in place. Result — eliminated all close locating and dowelling of individual parts and of course hours of time.

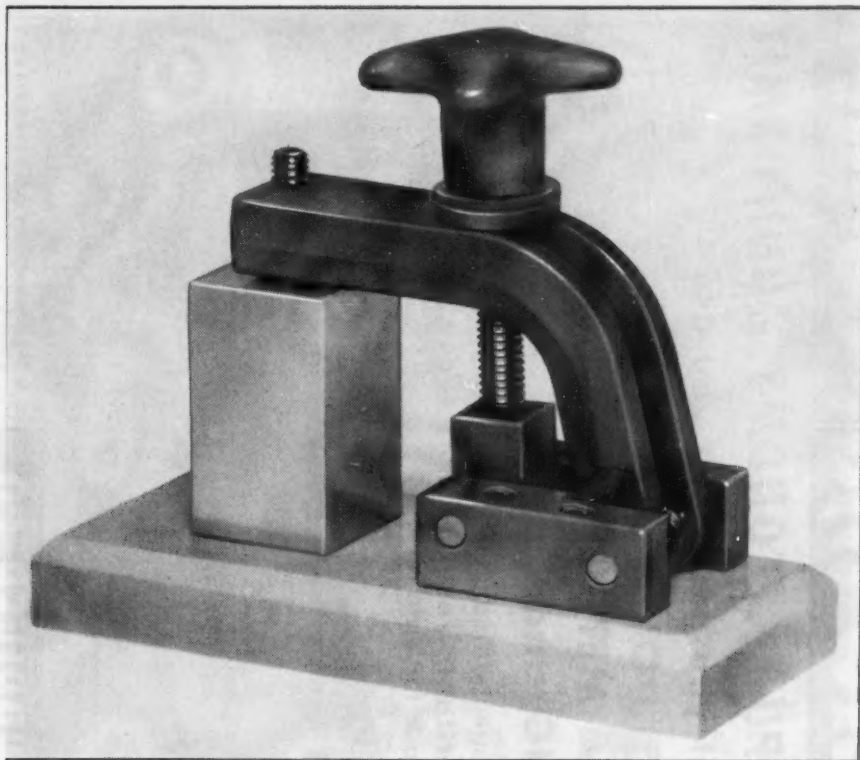
\*Vulcanaire equipment pays for itself on the first job.

**Borrow  
Vulcan's  
instructive  
movie on  
jig grinding**

## **Services of YOUR TOOL ROOM in Dayton**

Engineering, Processing, Designing . . . Special Tools . . . Dies . . . Special Machines . . . Vulcamatic Transfer Machines . . . Automation . . . including the Vulcan Hydraulics that Form, Pierce, Assemble and Size . . . Vulcanaire Grinding Heads . . . Motorized Rotary Tables . . . Plastic Tooling . . . Vulcanaire Jig Grinders.

**VULCAN TOOL CO. • 710 LORAIN AVE. • DAYTON 10, OHIO**



## LODDING RETRACTING CLAMPS

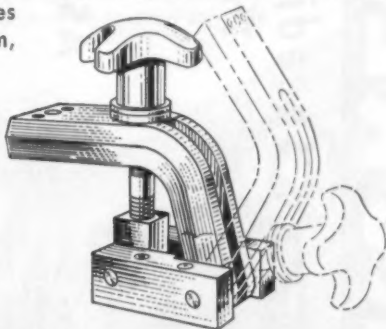
Lodding Retracting Clamps lend themselves to infinite variation. Jaws are added to suit work. Tapped and clear holes are there for you to use. Lodding provides four types of action — and your own imagination is the limit to the variety of jaws you can add. Four sizes each of four styles—hand knob, hand cam, nut and air operated.

### LODDING, INC. Worcester 1, Massachusetts

#### FACTORY WAREHOUSES

Precision Tool Sales	Bagby Engineering Co.
417 E. Florence Ave.	1047 Forest Ave.
Los Angeles 3, Calif.	Evanston, Ill.

For more data circle 278 on Reader Service Card





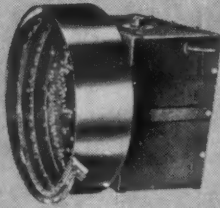
# It's RESULTS that count!

**Speedier OUTPUT...ECONOMY...UNIFORMITY**

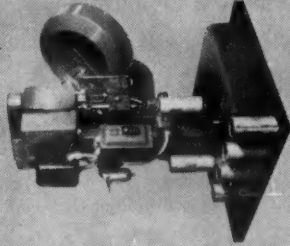
That's what you get when you use

## **DPS** POWER METHODS on your ASSEMBLING and FEEDING JOBS

Let these mechanical helpers bring you more profitable results, Write today, ask for catalog!

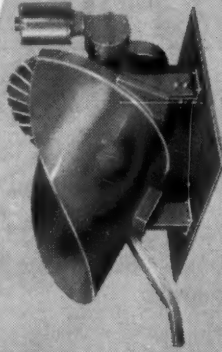


**BOWL FEEDER**  
Vibratory type, to select and feed smaller fragile parts



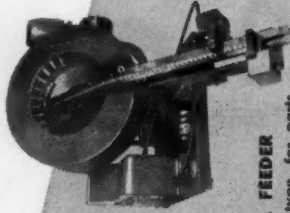
**SPECIAL ASSEMBLING MACHINES**

For light assembly operations using Selective Parts Feeders to feed component parts



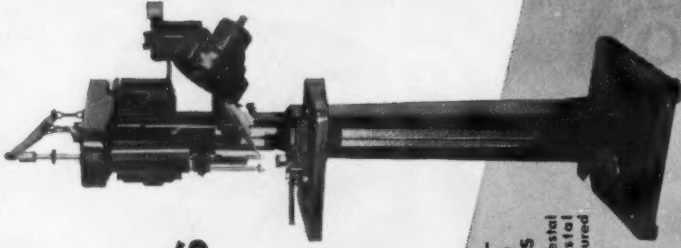
**BARREL FEEDER**

with stationary ring cover, for heavy-duty, large production runs



**BARREL FEEDER**

Conventional type, for parts requiring critical selection



**5 SCREW-DRIVING MACHINES**  
Bench and Pedestal types. Pedestal Model A pictured

# DETROIT POWER SCREWDRIVER CO.

2807 W. FORT STREET  
DETROIT 16, MICHIGAN

# Important Announcement

by



TO THE METALWORKING INDUSTRY

ON JULY 1ST, 1956, the Horton Chuck Division, Windsor Locks, Connecticut, became an operating Division of Greenfield Tap and Die Corporation, Greenfield, Massachusetts.

This step marks an important development in the history of these two companies, universally accepted as leaders in their respective fields.

"Greenfield" with its Ampco, Geometric and now Horton Divisions can offer to the metalworking industry the finest complete line of cutting tools and work holding devices obtainable.

The sales and distributor organizations of both Greenfield and Horton will continue to provide the excellent service which has been a hallmark in their years of continued growth and progress.

We take this opportunity to express our thanks to customers and friends of both companies for their fine acceptance and use of our products, and we pledge that the service and quality of which we are justly proud will continue to merit your patronage.



Greenfield Tap and Die Corporation  
**HORTON CHUCK DIVISION**

WINDSOR LOCKS, CONN.

For more data circle 280 on Reader Service Card



## GRINDING METHODS



CASE HISTORY NO. 24—LARGE MACHINE ENDS

Courtesy: Chicago Grinding & Machine Company

### How versatile skills of "Mattison-Equipped" subcontract shops can help you!



Production of precision oil seal rings is 100 per hour. Depth of countersink must be held within close limits.

Starting with their first "Mattison" in 1939, this Chicago company now has three No. 36 Vertical Spindle Rotary Surface Grinders and one High-Powered Horizontal Grinder—machines which permit handling diversified subcontract jobs at a profit.

Large machine ends, above, are ground top and bottom in six hours, each, removing  $\frac{1}{2}$  in. stock. Massive, double-column construction permits operator to "hog off" stock with maximum efficiency.

At the left, the "No. 36" grinds two sides of precision retainer rings at the rate of 100 per hour, holding size to plus .000 minus .003 in.

**Mattison Machine Works, Rockford, Illinois, U. S. A.**



**HIGH-POWERED  
PRECISION  
SURFACE  
GRINDERS**

For more data circle 281 on Reader Service Card

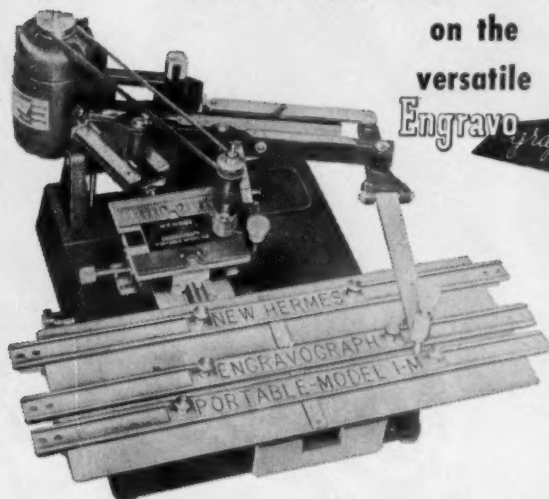
# THE NEW WAY TO MARK EQUIPMENT...

with

**GRAVO**  
*flex*

the first chip-proof, flexible engraving stock

on the  
versatile  
**Engravo**  
*graph*



So simple to engrave Gravoflex. Lettering will stand out permanently on contrasting background. No paint needed.

10,000 Engravographs in use for engraving on metals and plastics. Only the Engravograph has these patented features:

- Adjustable for 15 ratios. • Self-centering holding vise.
- Automatic depth regulator. • Adjustable copy holders.

Send for booklets

Engravograph Booklet IM-27 • Gravoflex Booklet G-27

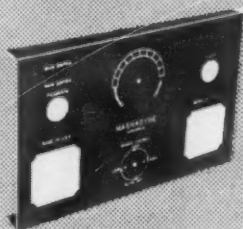
**NEW HERMES ENGRAVING MACHINE CORP.**

13-19 UNIVERSITY PLACE, NEW YORK 3, N. Y.

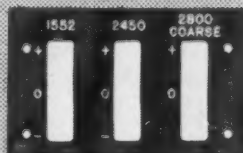
shear it



bend it



form it



punch it

America's oldest, leading shear  
*the most in accuracy, speed*



**NIAGARA**

**POWER SQUARING SHEARS**



# builder offers you and thrifty performance

One of the greatest values of a Niagara Power Squaring Shear is the unequalled experience of its builder. Niagara has been making shears for more than three quarters of a century.

Today, as in the past, the oldest leading name in shears stands also for the most modern in shear design. Niagara has continually set the pace in offering the most of things which count the most in dependable shear performance.

## YOU GET THE MOST IN ACCURACY:

- With the cutting line fully visible, the positive power actuated, self-compensating holddown grips work securely. Multiple pressure feet on 6" centers apply uniform pressure, contacting the work with low impact to safeguard material and bed against damage. Long or short work is held tight against the bed. There's no rippling of the sheet as the keen edged, low-sloped upper knife shears through... clean and smooth.
- Niagara's fully closed box section construction of bed, crosshead, holddown and housings plus ample and accurately held crosshead guides resist horizontal, vertical and torsional stresses with minimum deflection.
- Edges are trimmed straight and true within micrometer tolerances. Blanks, too, are cut accurately to size and shape without making compensating allowances when setting gages. Only a Niagara Shear possesses all of the necessary features to insure maximum accuracy!

## YOU GET THE MOST IN SPEED:

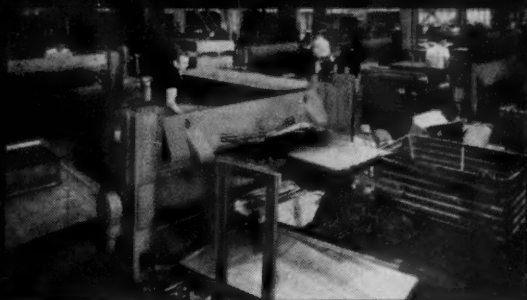
- More working strokes delivered per minute and instant engagement of the Niagara Sleeve Clutch assure more cuts per hour. In continuous feed shearing, quick release of the power driven holddown enables a strip to be cut at each stroke.
- There's no need to adjust knife clearance every time a different thickness of stock is cut. Individual holddown feet are self-compensating. Two sheets of different thicknesses can be cut at the same time with the same knife adjustment and with the same accuracy.
- Ease of operation, quick setting gages and confidence inspired by safety features further increase hourly output... and make a Niagara Shear a truly productive, profitable investment for you!

## YOU GET THE MOST IN THRIFTY PERFORMANCE:

- Simplicity of design, involving a minimum number

of parts, cuts out costly maintenance. With less to go wrong, there's less to repair and replace.

- Vital parts of Niagara's driving mechanism (clutch, gearing, flywheel, eccentrics and detent) operate in enclosed oil-tight cases. Ideal lubrication and maximum safety are thus insured.
- With power transmitted from the drive through efficient spur gears and Niagara's instant engaging, multiple-point sleeve clutch, there are no sliding surfaces (such as in worm gears and friction clutches) to consume power, generate heat and wear rapidly.
- Niagara 4-cutting-edge knives, manufactured entirely within the Niagara plant, are uniformly tough to withstand hard usage and are promptly available.



Niagara Shears at work in Ohio plant of one of the major electrical appliance manufacturers.

## MOST EXACTLY SUITED TO YOUR NEEDS, TOO!

To fit your requirements exactly, consult a Niagara representative. With over 7 dozen models available in capacities from shim stock to 1" mild steel and in cutting lengths from 3 to 24 ft., he'll be able to recommend the shear that's right for you.

## ILLUSTRATED, FACT-FILLED BULLETIN 69 MAILED FREE ON REQUEST

It will give you detailed information on the complete, modern line of Niagara Underdrive Squaring Shears. Write for your copy today.

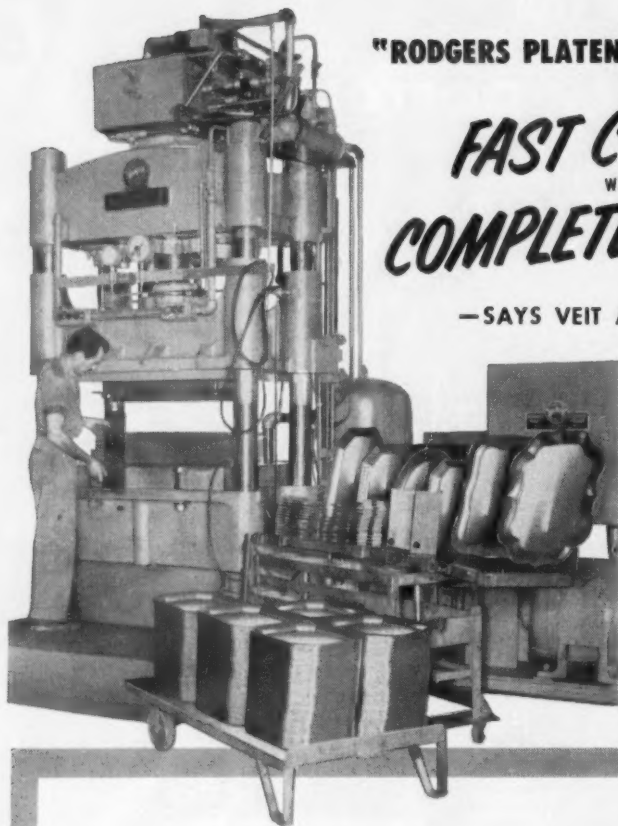


## NIAGARA MACHINE & TOOL WORKS, BUFFALO 11, N.Y. DISTRICT OFFICES

BUFFALO • CLEVELAND • DETROIT • NEW YORK • PHILADELPHIA  
Dealers in principal U. S. cities and major foreign countries.

America's Most Complete Line of Presses, Shears, Press Brakes, Other Machines and Tools for Plate and Sheet Metal Work.





"RODGERS PLATEN PRESS GIVES US

**FAST CYCLING**  
WITH  
**COMPLETE SAFETY**"

—SAYS VEIT AND YOUNG

Rodgers 400-ton platen press in use at Veit and Young, Huntingdon Valley, Pa., metalworking specialists. The press is equipped with die cushion, fast cycling cylinders and other accessories. Some of the products formed are stacked by the press.

Production has been increased in drawing and forming large serving trays and electrical panels by Veit and Young with their Rodgers Platen Press. Safety controls permit operators to concentrate on speed and accuracy. They are working type 303 stainless steel, brass, carbon steel, aluminum—from  $\frac{1}{32}$ " to  $\frac{1}{8}$ " thick with bends up to 90°.

Auxiliary cylinders lower and

raise platen quickly for fast cycling. Forming pressures are preset from 80 to 400 tons—die cushion up to 50 tons. Simple, fast adjustments govern all platen, pressure and time cycles. If you work in metal, plastic, rubber, veneers—you can mold, draw, form—*faster* with a Rodgers Platen Press. Capacities 10 to 600 tons. Send for Rodgers "Blue Ribbon" Platen Press Catalog.



**Rodgers Hydraulic Inc.**

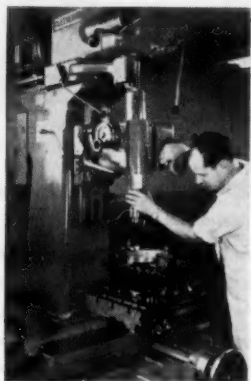
7447 WALKER STREET • MINNEAPOLIS 26, MINN.

For more data circle 285 on Reader Service Card

# CLEEREMAN

## DRILLING MACHINES

A battery of box column and round column Cleereman Drilling Machines on production work. One of many such installations producing at lower costs with higher production, less operator fatigue and no down time.

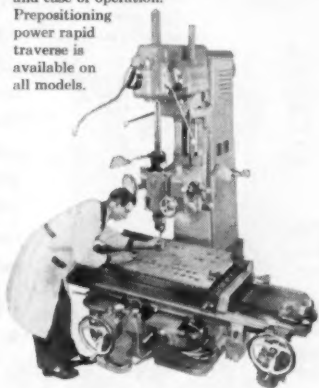


## LAYOUT DRILLING MACHINE

A modern solution to an old problem. Built for those tool room and manufacturing jobs which do not require the ultra precision of Cleereman Jig Borers. The Cleereman Layout Machine is an economical machine capable of locating within .001" per foot and drilling, boring, reaming, tapping, etc., with utmost operator ease at a fast rate of production.

## JIG BORER

Unexcelled precision for ultra-fine tolerances on highest quality gage, tool, die, jig and fixture work and on "jigless" production. Combines stamina with precision and ease of operation. Prepositioning power rapid traverse is available on all models.



**CLEEREMAN MACHINE TOOL CORP., Green Bay, Wis.**

For more data circle 286 on Reader Service Card

# Speed **MULTIPLE CUTS**

**on vertical boring mills  
with Davis 8-Position  
Indexing Tool Holder**



**MODEL B**

Length 24 1/2",  
weight 210 pounds

**1** HOLDER  
SETUP

**4** TOOLS  
MOUNTED

**8** INDEXED  
POSITIONS



**MODEL A**

Length 21", weight 105 pounds

**PRODUCTIVITY** of your vertical boring mill—regardless of make or model—can be profitably increased with this new cost-cutting accessory.

Held in the machine ram head, the Davis Indexing Tool Holder mounts four square-shank cutter bits for successive operations without relocating the work. Also, it presents each tool either square with the work or inclined at a 45° angle, making it useful for a broad range of cuts. Indexing between operations is completed in a matter of seconds, sharply reducing floor-to-floor time. And substantial savings in machining time on multiple operations quickly repay cost of tool holder. Get complete information—learn how your vertical boring mill work can be made more profitable.

## **PROFIT-BUILDING ADVANTAGES**

- ★ Accurately indexes to 8 positions in 45° steps—instant setting.
- ★ Completes 4 operations without changing tools or relocating work.
- ★ Supplied for right or left-hand ram heads of any vertical boring mill.
- ★ Bores, turns, faces, chamfers, and undercuts.

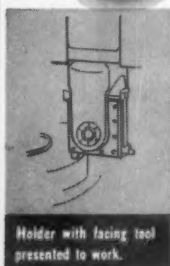
# DAVIS

**BORING TOOL DIVISION OF**

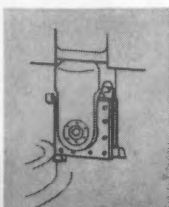
**Giddings & Lewis Machine Tool Company**  
Fond du Lac, Wisconsin



**THE ONE NAME THAT CERTIFIES ULTIMATE PRECISION AND PRODUCTIVITY IN TOOLING**



Holder with facing tool  
presented to work.



Holder indexed 90° to  
present turning tool.



Holder indexed at 45°  
for chamfering.



Tool holder indexed at  
90° for undercutting.

2

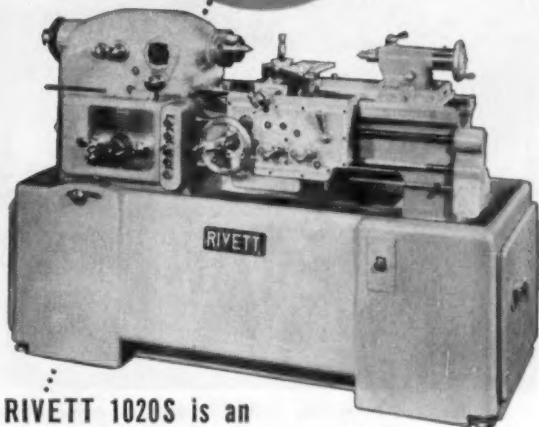
FOR

1

## RIVETT 1020S

HAS WHAT IT TAKES TO MAKE  
AN OUTSTANDING LATHE

- ★ 40% heavier than comparable lathes. Weighs 3900 lbs.
- ★ Back gearing for power cuts—belt drive free of all gearing for high speeds. Range from 22 to 3600 R.P.M.
- ★ 12¾" wide hardened steel ways of bed absorb heavy cutting force.
- ★ Infinite spindle speeds through trouble-free mechanical drive.
- ★ Push button controls for complete operation.
- ★ Neutral clutch stops spindle without stopping drive.
- ★ Three bearing mounts for spindle.
- ★ Collets mount directly in spindle.
- ★ Hand wheel for turning headstock spindle.



**RIVETT 1020S is an  
Instrument Lathe and an Engine Lathe**

A double-duty machine—combining the feather-touch sensitivity of an instrument lathe with that heavy-biting ruggedness which carbide cutting tools require—qualifies for any turning within its 12½" swing and 20" centers.



Write for  
Bulletin 1020A

# RIVETT

**LATHE & GRINDER, Inc.**

Dept. MMR8, Brighton 35, Boston, Massachusetts

You can use other lathes . . . or employ other types of metalworking machines . . . but on no other tool can you get so much production with such fine precision as on a Rivett.

For more data circle 288 on Reader Service Card

August, 1956

modern machine shop 89

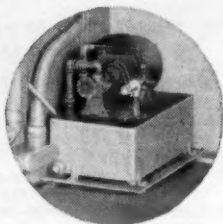
A LITTLE



VALVE does a big job  
on

**THE WORLD'S  
LARGEST  
BAND SAW  
AND FILER**

built by The DoAll Co.,  
Des Plaines, Ill., for the  
Air Force's "Heavy  
Press Program"



Operated by remote control from a suspended platform, this huge machine cuts intricate die cavities in die blanks weighing up to ten tons. Intended for the world's largest extrusion press (14,000 tons), these dies will shape the largest and longest structural aluminum extrusions ever produced. Jaws for the world's largest extrusion stretch-conditioner (3,000,000) are also cut on this Band Saw.

● **FULFLO VALVES**

By-Pass, Oil-Relief, Piston Type Hydraulic for machine tool hydraulic mechanism, oil-burning equipment, rams, presses and Diesel engines.

STANDARD OR FLANGE TYPES

for pressures from 0# to 500 #

Write for personal copy,

**FULFLO  
MECHANICAL  
DATA BOOK**



**THE FULFLO SPECIALTIES CO. Inc.**  
PUMP AND VALVE MANUFACTURERS  
BLANCHESTER, OHIO

For more data circle 289 on Reader Service Card





## ALLIED INSTALLS LINDBERG CARBONITRIDING FURNACE WITH CORRATHERM ELECTRIC ELEMENT

Here is a photograph of the new Lindberg furnace recently installed by Allied Metal Treating Corporation, Kenosha, Wisconsin. Allied, and other commercial heat-treaters, always leaders in the acceptance of better heat-treating methods have been quick to appreciate the revolutionary advantages of Lindberg's new CORRATHERM electric heating element.

Where electricity is the preferred source of heat, Lindberg furnaces provide to the fullest degree the versatility and dependability required in efficient commercial heat-treating.

Whether your heat-treating operations are commercial or captive, large or small, the new CORRATHERM element in Lindberg furnaces offers you these exclusive advantages:

**Low voltage:** Operates at extremely low voltage. No leakage through carbon saturation.

**Atmosphere circulation:** Elements act as baffles to direct circulation of convection streams.

**Safety:** Extremely low voltage eliminates shock or short hazards.

**Durability:** Watts density at all-time low. Element practically indestructible.

**Easily installed:** Element just hangs in furnace. No complicated mountings required.

To apply all these advantages to your own heat-treating processes—get in touch with your nearest Lindberg Field Representative. (Look in classified phone book.)

**LINDBERG**  
ENGINEERING  
COMPANY

2469 West Hubbard Street, Chicago 12, Illinois  
Los Angeles Plant: 11937 Regentview Ave., at Downey, California



## OVER THE EDITOR'S DESK . . .



### REAPING RICH REWARDS

The following thought-provoking article is quoted from a recent issue of "Listen Americans," written by Dr. George S. Benson, Director, National Education Program.

One great difference between the American economic system and Socialism is in the manner in which industrial management is selected. In a Socialist system the Government owns or operates the industries and thus takes over the job of choosing the managers of industrial enterprises. In America, through the workings of our private enterprise system, the purchasers, or the public, make the choice. In the Socialist nations, the choice almost always is governed by political considerations. In our system, the choice is based on ability and efficiency.

Our system screens out inefficient management. It screens not through the colored glasses of the politicians but through the hard realities of the school of competition. When a product goes to market in America it is placed side by side with other products very much like it. The customer inspects them all. He selects the one he likes best on the basis of price, quality and service. The man-

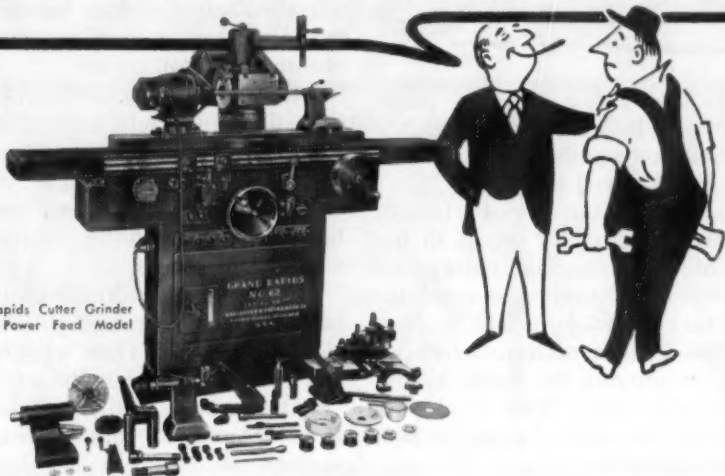
agement of the company that made the product which the customer selected has scored a competitive victory over the management of the companies whose products the buyer passed by.

When many customers select the same product this means that the company which produces this product is satisfying the consumers. It also means that the other companies, which produce competitive products, are not satisfying the consumers quite so well. And to be successful a company must sell its merchandise. Thus management must be constantly striving to make a better product—at a lower cost. If it fails to meet the competition of the market place, it sooner or later goes out of business.

Alfred Edwards, of London, former member of the Socialist-Labor Party of Great Britain, wrote a Reader's Digest article in which he gave some of the reasons for his turning against Socialism. He said the Socialist Government chose a taxi-driver to manage one of the big coal industries in England—not because of his ability as a manager of a coal mine (he hadn't any such ability), but because he happened to be a loyal and popular member of

**I'LL DO THE SET-UP ON THE GRAND RAPIDS GRINDER**

Grand Rapids Cutter Grinder  
No. 62 Power Feed Model



*The boss knows a soft touch when he sees one. He's been around the toolroom long enough to know that Grand Rapids Cutter Grinders are famous for unusually fast and convenient set-ups. Like toolroom experts everywhere, he knows, too, that Grand Rapids Cutter Grinders are unmatched for precision sharpening, fast, easy operation and minimum maintenance.*

Model 62 has four-speed spindle drive, fully guarded ball bearing ways, more vertical capacity and exceptionally long swing. One-shot lubrication system cuts maintenance time.

Take a tip from the boss . . . choose Grand Rapids Cutter Grinders for fast, easy, *precision* toolroom grinding.



**GALLMEYER & LIVINGSTON COMPANY**

408 Straight Ave., Grand Rapids, Mich.

Please send me literature on the complete line of Grand Rapids Cutter Grinders:

Name  Firm

Address

City  State



the Socialist-Labor political party in power. He managed miserably and everybody suffered as a result but still he stayed in.

All areas of our society benefit from the system that brings to the helm of our industrial enterprises the very best brains and capabilities. The consumers benefit by having this efficient management constantly improving the products and cutting the costs. The employees benefit by the improvements in production machinery and techniques, in higher productivity and higher wages. Stockholders benefit through regular dividends from well-managed companies. Our screened management, indeed, is another great plus-factor in the formula for America's unmatched living standard.

Dr. George S. Benson, Director  
National Education Program

★ ★ ★

## QUALITY MERCHANDISE

We think Roy Eastman of The Eastman Research Organization voices so excellently the "unfinished business" situation as it exists today that we are taking the liberty of quoting parts of his letter herewith.

He begins his letter by saying that Iris has just bought herself a new automobile. Beautiful job and runs like a dream. But she still swears she's going to name it "Temporary." Within the first week she went back

to the dealer with a list of minor defects — nothing major — as long as her arm. Like the door handle coming loose, trip mileage not working, chrome trim falling off.

"We'll fix the door handle, temporarily," they told her. "The rest when you come in for your first service. *These things are to be expected.*" I emphasize the last sentence because it's poignantly significant — and all too true.

X has spent millions of dollars building an unapproachable reputation for quality. Then why in tunket don't they finish the job?

It has become traditional that few, if any, American cars are ready for delivery to the customer when they reach the dealer's floor. We're told that only foreign cars are really finished by their makers before the dealer gets them. What a commentary on American craftsmanship!

It's all due, or chiefly due, to the mad race for volume. Slap them together, turn them out, beat last month's record.

Well, records aren't being beaten right now. Dealers have cars running out of their ears — even X's. Over-production they say. But someone has countered with the remark that there's no such thing as over-production, it's under-consumption.

Consumers, by and large, have more money than is good for them. Can it be, then, that part of the reason for the slump in automobile sales is the breeding reluctance of car owners to give up the car they have finally paid for and go through the grief of buying a new one?

Automobile manufacturers are

# Know your feed... set your speed!

no magnifying glass



no calculations



no guessing



quickly . . . almost automatically with the  
**LODGE & SHIPLEY** *Powerturn* LATHE  
and **SPEED-DIAL HEAD!**

Take "by-guess" and "by-golly" confusion out of lathe operation! Lodge & Shipley POWERTURN Lathes with SPEED-DIAL Head make speed selection and setting simple as **a...b...c!**

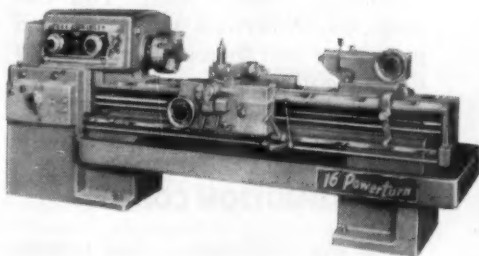
**a...set work diameter**

**b...read r.p.m. opposite cutting speed**

**c...set levers to automatic indicator lights**

This time-saving, fool-proof, simplicity is but one feature of the New POWERTURN Lathes.

New literature tells the complete story: how POWERTURN Lathes turn to higher levels of profitable operation: 13, 16 and 20-inch sizes; Engine, Tool-maker and Gap types plus famous COPYMATIC with both 45° and 90° tool slides.



## Lodge & Shipley

*your LODGE-ical choice!*

The Lodge & Shipley Company,  
3058 Colerain Ave., Cincinnati 25, Ohio

For more data circle 291 on Reader Service Card



not the only ones at fault. If you who are reading this have made one single major purchase in the past six months without a defect or disappointment of some kind, you're deserving of a plaque in the Hall of Fame.

Sure as thunder, there's a day of reckoning at hand.

Advertising today is concerned mainly with tomorrow's sales—and only with sales. It's high time that more thought—and downright prayerful thought at that—were given to *deliveries*.

Captains of industry should get out of their board rooms and fancy offices into their assembly plants and see what kind of jobs they're really turning out. Advertising agency men should give as much attention to the product that is being put behind their advertising as they do to the advertising they put behind the product.

History repeats itself. You can push the American public around just so far and then suddenly comes the revolution.

★ ★ ★

#### FOR PUSHBUTTON CONFLICT

Our big challenge — and responsibility—in the machine tool industry is to work as hard as we can to keep ahead of the most rapid conceivable rate of obsolescence that can be foreseen in military weapons

according to W. Fay Aller, Vice-President and Director of Research for the Sheffield Corporation. Speaking recently before a joint meeting of defense industry advisory committees in Washington, Mr. Aller declared that the responsibility naturally propels the machine tool industry into planning the automated defense production plant of the future and doing so with full speed ahead and in the fullest detail that knowledge, experience and vision will permit.

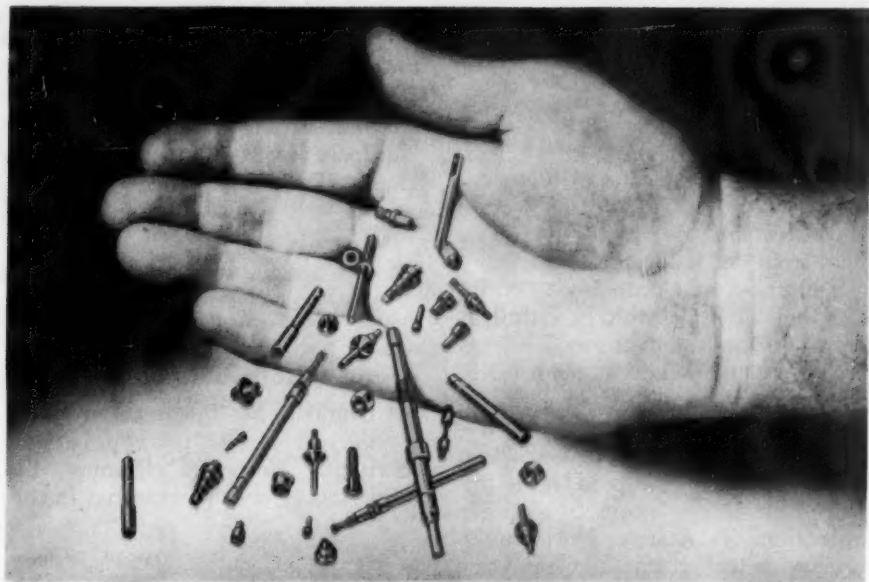
In military production, both the armed forces, science and industry are faced with the challenging fact that anything that is stockpiled today may be obsoleted tomorrow, or a year from tomorrow by the amazing speed of development in weapons, technology, research, design and also competition of the most rigorous and compelling kind. By applying a stockpiling principle in processing technology as well as materials, industry can help the nations's armed forces buy the needed "time insurance" at a relatively nominal cost.

★ ★ ★

#### WISHING RULED OUT

Just a year ago the Commission on Organization of the Executive Branch of the Government (Hoover Commission) reported to Congress that the total number of government commercial and industrial type facilities in the Defense Department alone "probably exceeds 2,500." Among the 47 categories of such activities were such items as coffee roasting plants, tree and gar-





## Do small parts like these give you large problems?

Anaconda Rod solved costly production problems  
for G & F Manufacturing Company, Philadelphia

The trend toward miniatures has led to a tremendous increase in the use of small precision parts like these. And this has placed a heavier burden on the screw machine operator and the buyer of rod. Uniformity of alloy and dimension in batch after batch of screw machine rod is vital for economical production.

**ONE COMPANY'S PROBLEM:** The G & F Manufacturing Company of Philadelphia specializes in automatic screw machine production of minute parts, finished to precise dimensions. This company was experiencing costly production delays with the rod they were using, due to jamming and freezing of the rod as it was fed into the machines.

**THE SOLUTION:** Then G & F tried Anaconda Free Cutting Brass-271 Rod in the diameters required for their type of small-part production. They found it highly satisfactory. Down time, due to jamming or freezing of the rods, has been practically eliminated and production schedules are com-

pleted without costly interruption.

Whether for small parts of extreme accuracy—or for ordinary screw machine production—The American Brass Company can furnish free-cutting copper and copper-alloy rods fabricated to meet the requirements of the operation—uniform in length, diameter, temper and composition.

**FREE TECHNICAL SERVICE:** It is the function of the Technical Department of The American Brass Company to assist metal users in the solution of special problems. This service is at your disposal without charge or obligation.

Comprehensive data on composition and machinability of standard Anaconda Alloys, standard specifications, weights and dimensions of standard rods is available in Publication B-3. For this booklet—for special technical assistance—write: The American Brass Company, Waterbury 20, Conn. In Canada: Anaconda American Brass Ltd., New Toronto, Ont.

**ANACONDA® RODS FOR SCREW MACHINE PRODUCTS**

For more data circle 292 on Reader Service Card



## OVER THE EDITOR'S DESK . . .



den nurseries, false teeth factories, ice cream manufacturing plants, laundries and scrap processing plants. Of the 2,500 total, the Commission said that probably 1,000 individual facilities could be eliminated without injury to our national defense or any essential government function.

Government-run businesses deprive the Government of taxes that otherwise would be paid were private businesses conducting these operations. They are unfair competition with private industry upon which our country traditionally depends.

Government competition with private businesses can be reduced only when businessmen and the public at large put forth the effort to do so. Wishing will not make it so.

★ ★ ★

## Letters to the Editor:

### Wire Forming

I will appreciate any information that you can send me on the subject of forming small spring steel wire.

L. W. Evans, President  
Evans Specialty Company, Inc.  
1800 East Grace St.  
Richmond 23, Virginia

● *List of equipment manufacturers sent. Interested manufacturers please contact inquirer.—Ed.*

### Turbochargers

Will you please send to the attention of the writer, tear sheets of the excellent article written by Gilbert C. Close: "Mass Producing Diesel Engine Turbochargers," which appeared in the June, 1956 issue of *Modern Machine Shop*?

H. H. Lurie, Special Projects Research  
Cummins Engine Company, Inc.  
Columbus, Indiana

### Swinging Bolts and Clamps

I would appreciate receiving one set of tear sheets or reprint of "Swinging Bolts and Clamps" by Fred Rogers, which appeared in the June issue.

John O. McDonald, Engineer  
Bakelite Company  
River Road  
Bound Brook, N. J.

Will you please send us information as soon as possible as to the source of supply of the Swinging Bolts mentioned on Page 112 of your June issue.

Elmer Franz, Purchasing Agent  
The Bettcher Manufacturing Company  
West 61st at Clark Avenue  
Cleveland 2, Ohio

● *List of manufacturers sent.—Ed.*

### Die Casting

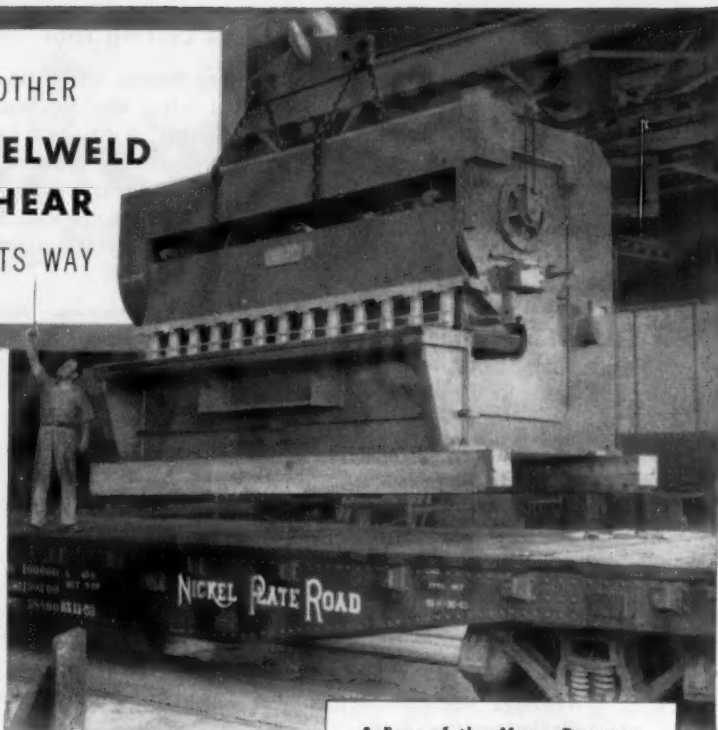
We are wondering if you would be in a position to supply names of firms that manufacture lead die casting equipment for manufacturing fishing sinks.

John T. Halls  
Aeroplane Tackle Manufacturing Co.  
748 Lincoln Street  
Denver, Colorado

● *List of manufacturers sent.—Ed.*

ANOTHER  
**STEELWELD  
SHEAR**  
ON ITS WAY

From every angle a Steelweld shear looks good — and is good. This machine is rated for 12'-0" x 1 1/2" steel



**S**HIPMENTS are being made at a rapid rate to all parts of the country because more and more users are learning of the many merits of Steelweld Shears and are talking about them. As the words of experience spread about and comparisons are made, more and more people come to realize that Steelweld Shears are really outstanding.

For smooth, accurate burr-free cutting, Steelwelds can't be beat. For ease of operation they have no peer. Their heavy construction and means for simple, easy maintenance assure long trouble-free life.

For the finest in shearing, you can't make a better selection than Steelweld. Say the word and we'll have one of these wonderful machines on the way to you.

**A Few of the Many Reasons  
For STEELWELD'S DEMAND**

1. Pivoted-blade operation. Entirely different from every other shear. No slides or guides to wear and cause inaccuracies.
2. Micro-set knife adjustment. Quick easy knife-clearance adjustment for every plate thickness. Something not matched elsewhere. Be sure to get the complete story on this.
3. Mechanical hold-downs. Tight gripping, non-leaking, quiet operating.
4. Accurate easy operating back gauge rides on ball bearings.
5. Cool-operating, long-life, low-inertia clutch and brake.
6. Heavy all-welded rigid one-piece steel frame.

**AVAILABLE FOR PLATE LENGTHS TO  
24 FEET AND THICKNESSES TO 1 1/2 INCH**



**GET THIS BOOK!**

CATALOG No. 2011 gives construction and engineering details. Profusely illustrated.

**THE CLEVELAND CRANE & ENGINEERING CO.**

6451 East 282nd St., Wickliffe, Ohio

**STEELWELD**  **SHEARS**

For more data circle 293 on Reader Service Card



### Epoxy Dies

We read the January issue of Modern Machine Shop from cover to cover but we apparently slipped up on the article "How to Make and Repair Epoxy Dies" which appeared on Pages 128 through 132. Is it possible for you to send me tear sheets of the article?

Raymond D. Gross, Manager  
The Rayoscope  
358 North Sandusky Street  
Delaware, Ohio

Please send me tear sheets of the article "How to Make and Repair Epoxy Dies" from the January issue of your magazine.

O. C. Kallay  
Hammond Manufacturing Co.  
Wellington Street West  
Guelph, Ontario, Canada

### Personnel Conferences

Please send me a reprint of the article "Personnel Conferences for Executives" which was published in the May issue.

James E. Drylie  
Thomas Machine Manufacturing Co.  
1253 Commercial Trust Bldg.  
Philadelphia 2, Pa.

In reading through your May issue I noticed the article "Personnel Conferences for Executives." Would it be possible to obtain a reprint of this article for my files?

Kenneth M. Lucas, Jr.  
237 Rochelle Park  
Tonawanda, New York

### Radius Cutting Tool

There was at one time on the tool market what was known as a "Radius Cutter" for use on lathes, shapers, boring mills, planers, and so on. We are in the market for a tool of this nature but are unable to locate anything. Do you know the source of manufacture?

C. E. Thompson, Purchasing Agent  
Berks Engineering Company  
6th and Chestnut Sts.  
Reading, Pa.

● *It is our opinion that the tool to which you refer is the Monarch Shaplane Radius Tool, which is marketed by C. B. Teeter, 4470 Oak-enwald Ave., Chicago 15, Ill.—Ed.*

### Standard Costs

Will you please send me twelve reprints of the article by Jack E. Bedford, entitled, "Standard Costs in Accounting for Profits" which appeared on Page 126 of your June issue.

H. J. Miller, Owner  
Miller Machine Tool and Gauge Shop  
3613 San Fernando Road  
Glendale 4, California

### Trade Shows

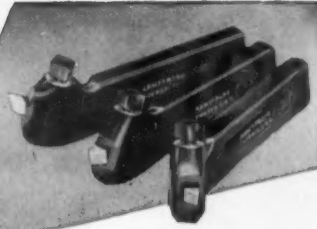
We have developed a new item that we would like to display and would appreciate your advising us as to any trade shows in the metal-working field to be held during the next few months.

Earle L. Morrow  
Morrow Mfg. Co.  
Old Baptist Road  
East Greenwich, Rhode Island

● *List of trade shows sent—Ed.*



# ARMSTRONG TOOL HOLDERS



answer both . . .

1. The problem of lowering costs
2. The problem of increasing output

By providing permanent, multi-purpose, inexpensive ARMSTRONG TOOL HOLDERS that use cutters or bits that are quickly ground from standard high speed shapes (Saving: All Forging, 70% Grinding and 90% High Speed Steel), the Armstrong System of Tool Holders will reduce your tool cost to an absolute minimum.

By providing stronger, more efficient tools, carefully developed for each operation, as well as ARMSTRONG High Speed Steel, ARMALLOY Cast Alloy Cutter Bits or Armide Carbide-Tipped Cutters as required for each job, ARMSTRONG TOOL HOLDERS permit greatly increased speeds and feeds, enable you to increase the hourly output of every lathe, planer, slotter, shaper, turret lathe and screw machine.

There is no surer way to lower costs and increase output, than to use the correct ARMSTRONG TOOL HOLDER for each operation on all machines.

## ARMSTRONG BROS. TOOL CO.

"The Tool Holder People"

5228 W. Armstrong Ave. Chicago 30, U.S.A.

Eastern Warehouse and Sales: 199 Lafayette St., N. Y. 12, N. Y.  
Pacific Coast Whse. & Sales Office: 67 Eleventh St., San Francisco 3, Calif.



For more data circle 294 on Reader Service Card

# FEATURES IN

## **HOT FORMING TITANIUM**

**By L. Deane Noble**

This article comprises a case study concerning the use of titanium in the manufacture of bomber outboard wing slats at the El Segundo Division of Douglas Aircraft Company. The illustrations included with this article show step by step the production cycle followed in producing the parts. Page 104.

## **NOVEL SETUPS FOR DRILLING WASHING MACHINE SHAFTS**

**By Robert P. Jones**

At the St. Joseph, Michigan plant of Whirlpool-Seegar Corporation, high speed precision drilling of components for automatic washing machines has been expedited by setups devised in the factory for use with standard drill presses. Page 108.

## **ESSENTIAL ELEMENTS OF THREAD AND FORM ROLLING**

**By Clifford T. Appleton**

In this second installment of a three-part article, the author continues his discussion of the various types of equipment available for thread rolling, including rotary planetary machines, cylindrical die machines, screw machines and thread rolling dies. Page 110.

## **THE QUEST FOR THE ONE BEST WAY**

**By W. A. Nordhoff**

This article provides a thought-provoking review of the many factors which influence the cost of a product and which frequently are beyond the control of an operator. Page 118.



**AUGUST  
1956**

# THIS ISSUE

## **LATHE SETUP FOR REMOVING WELDING FLASH**

To assist an automotive manufacturer, faced with the problem of removing welding flash on a worm shaft assembly on a high production basis, The Seneca Falls Machine Company equipped its new Model "LN" automatic lathe with certain standardized units to provide a specialized high production machine. Page 126.

## **DUPLICATION TURNING ELIMINATES COSTLY DELAY IN AIRCRAFT PARTS PRODUCTION**

**By Gilbert C. Close**

A large West Coast aircraft manufacturer utilizes a modified duplicating lathe to automatically reproduce odd-shaped three-dimensional parts from a wood pattern, a master part or an ordinary production part. Illustrations show various duplicating lathe setups, as well as typical parts produced with these setups. Page 132.

## **MACHINING STAINLESS STEEL**

**By G. J. Stevens**

This case history points out how chip elimination difficulties were overcome in box-tooling 9/16-inch stainless steel hexagons. Page 142.

## **CONVERTING A GRINDER TO INCREASE PRODUCTION**

**By Bartlett West**

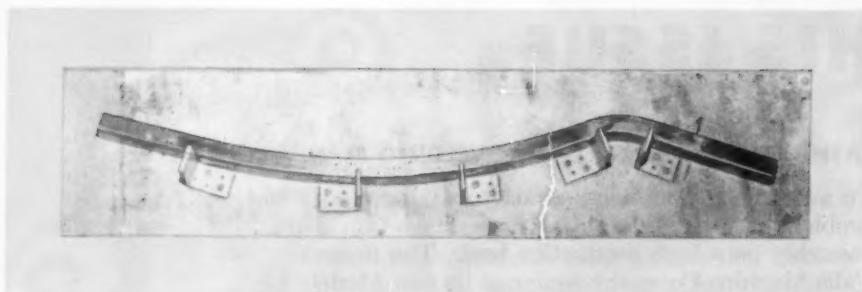
By equipping a Brown and Sharpe No. 3 single purpose grinding machine with precision machine tool attachments, it is possible to quickly and easily perform four grinding operations with one setup. These operations include outside diameter grinding, end grinding, groove grinding and cutoff. Page 146.

**VOL. 29**

**NO. 3**







*A finished titanium alloy wing slat part and its check fixture. Tolerances are critical.*

## Hot Forming Titanium

*A case study concerning the use of titanium in the manufacture of bomber outboard wing slats.*

By L. DEANE NOBLE

Materials and Process Engineer,  
El Segundo Division,  
Douglas Aircraft Company

**Rush jobs are commonplace in airplane production work.** Most of these occur during the initial flight test phases of a new model. When something must be altered, a "change order" is issued by the engineering department and transmitted to the shop. "Change orders" are usually complicated by two factors. First, it is not possible for the shop to prepare for them, for it is not known when or where the change will occur, nor what parts will be affected. Secondly, when a change is necessary during the initial test flight period, the preset date of the qualifying trials by the plane purchaser is approaching and time is limited.

A "change order" involving all of

these complications occurred recently at the El Segundo Division of Douglas Aircraft Company during the initial flight tests of the Navy's new A4D jet-propelled bomber. The original design called for outboard wing slats made of steel. But during the test flight program, it was discovered that these steel slats interfered with compass operation, which in turn affected bombing accuracy. A "change order" was issued.

**The requirements for the new slat** were as follows: tensile strength, 140,000 p.s.i.; yield strength, 130,000 p.s.i.; elongation, 10 per cent; reduction of area, 30 per cent. The material had to be non-corrosive, para-magnetic, and the finished part had to exhibit a

**"... bar stock would have to be hot formed, as it would rupture if formed at room temperature."**

surface finish of 63 r.m.s. The blank part was approximately 1 inch square and 35 inches long. This blank had to be formed into an "S" shape, involving a  $3\frac{1}{2}$ -inch radius bend on one side and a  $30\frac{5}{16}$ -inch radius bend on the other. Finished tolerances were critical.

A quick survey of materials available indicated that titanium would fulfill all the physical requirements, and exhibit an advantage of being 43 per cent lighter than the steel slats. The problem then was how to produce a titanium part in the proper "S" shape and within the necessary surface finish and tolerance requirements.

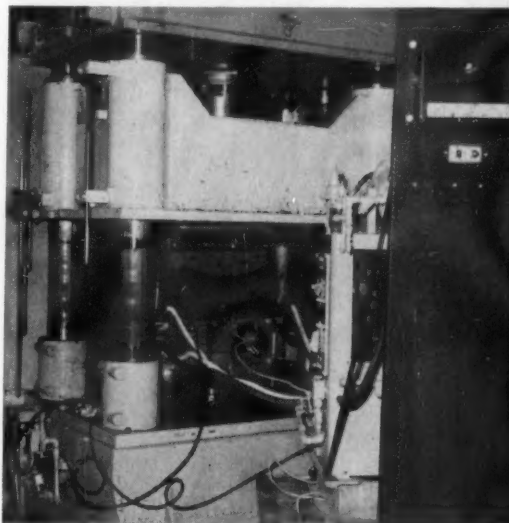
**Forgings were considered**, but titanium does not machine easily by any of the conventional methods. Climb-milling could have been used to machine the sides of the "S", but there was no time in which to construct the rigid holding fixtures and frames necessary for this process. And in climb-milling, chatter and backlash might have been excessive when machining the "S" curves.

The most promising alternative to the use of forgings was to use bar stock of the proper cross-sectional size and length. It was evident from the first that this bar stock would have to be hot formed, as it would rupture if it was formed at room temperature.

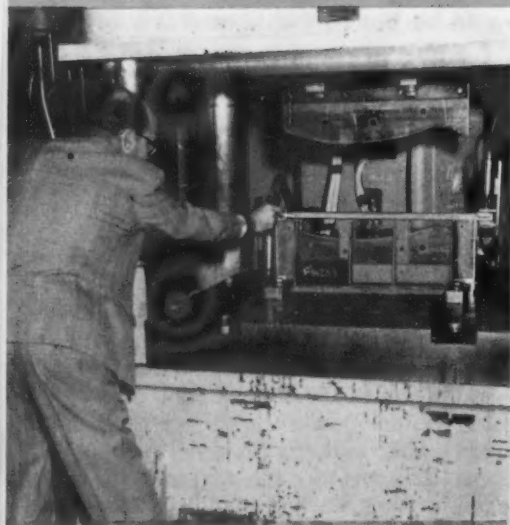
An analysis of the Strength vs. Temperature graph on C-130 AM

titanium alloy showed that the tensile strength does not drop below 100,000 p.s.i. until 500 degrees F. is reached. From that point, there is no appreciable drop until 900 degrees F. is reached. But by extrapolation, the curve indicated that at 1200 degrees F. the yield strength would drop to 15,000 p.s.i., and ductility would increase to 25 per cent. This would make it possible to hot form the part on the 600-ton hydraulic press we had available.

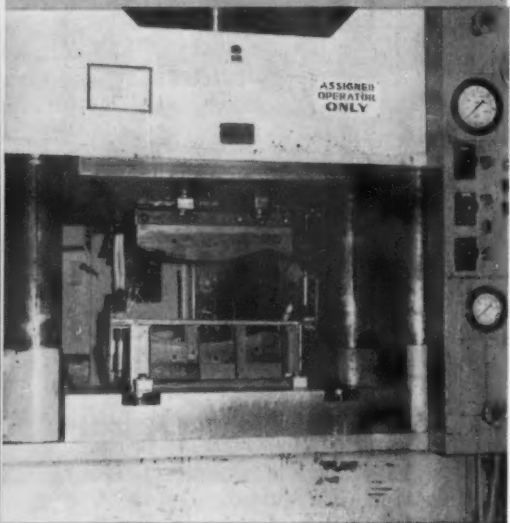
The next problem was how to



**Setup used for hot forming the C-130 AM titanium alloy wing slats. Converted 37.5 kva. spot-welder transformer with super-mounted thermocouple is shown at right. Leads from both the transformer and thermocouple go directly to the part being formed.**



*The author checks a part with a Tempilstik during the early stages of development.*



*A titanium wing slot blank in the press with pneumatic transformer clips attached. Clips are shoved off by descending platen to interrupt current when forming cycle starts.*

**"... electrical conductivity of titanium is very low."**

heat the titanium bar prior to forming. There were no furnaces near the Williams-White press, and space limitations prevented moving in a portable furnace. Then, as the electrical conductivity of titanium is very low, being only 3.1 per cent that of copper, a decision was made to use resistance heating. A 37.5 kva. transformer was removed from an old Taylor-Winfield spot-welder, stationed beside the press, and hooked to a 440-volt line. A visual-recording thermocouple was super-mounted on the transformer, with a lead to the part to be formed. Heavy braided copper cables with pneumatic-clip terminals lead from the transformer to each end of the part. These pneumatic clips were so designed that when the press platen descended, a cam action shoved them from the titanium part, thus breaking the current path.

Tempilstiks were used to double-check on the thermocouple during initial trial runs and establishment of a usable production forming cycle. As any degree of springback always inserts an "X" factor in the finished dimensions of a formed part, we knew from the start we would have to minimize springback to a negligible amount. This was considered during the trial runs.

**The illustrations with this article** show step-by-step the production cycle finally worked out. The entire cycle requires approximately seven minutes. The part is placed on the forming dies and the

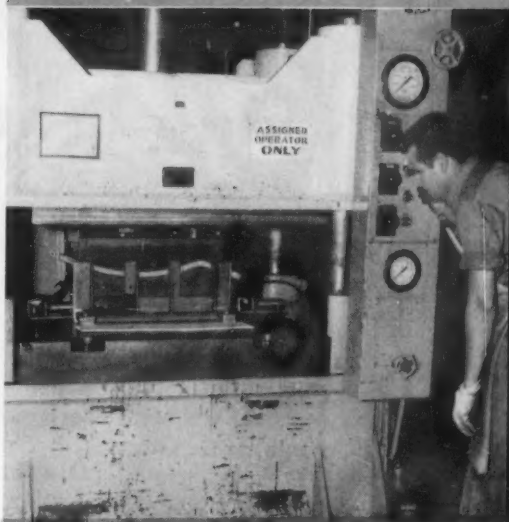
**"Heating has no deleterious effect on titanium."**

pneumatic transformer clips are attached. The current is turned on and the temperature of the part is raised to 1150-1200 degrees F. It is allowed to "soak" at this temperature for two minutes. The press is then actuated to apply 50 tons of forming pressure. As the press platen descends, it "kicks" off the transformer grips, thus interrupting the current supply. Press pressure is then increased gradually to 300 tons as the part cools. This reduces all spring-back tendencies to a negligible degree. Cooling requires from 1-1½ minutes because of the greater mass of the cold dies.

Due to the natural heat resistance of the titanium alloy, heating the part to 1200 degrees produces only about 0.0001 inch of surface scale. This is buffed on a cloth wheel to produce the necessary 63 r.m.s. surface finish. A check fixture is used to check the part immediately after it is removed from the press.

**Despite the "cold" start** in producing the hot-formed titanium part, results have been very successful to date. More than 400 formed titanium wing slats have been produced, all on the same set of 1020 S.A.E. steel forming dies. Heating the alloy to 1200 degrees F. has no deleterious effect on the titanium alloy. It is the opinion of the author that this technique and similar techniques can be used in hot forming many and various titanium alloy parts that conform to the requirements of resistance heating.

August, 1956



*Press closes to form part. 50-ton pressure is used for initial forming; 300 tons later.*



*Removing the formed part from the press. Heating the part to 1,200 degrees F. produced only about 0.0001-inch of surface scale. This scale is buffed with a cloth wheel.*

modern machine shop 107

## NOVEL SETUPS FOR

# Drilling Washing Machine

**Standard drill presses equipped with shop-built holding fixtures are used.**

By ROBERT P. JONES

Chief Engineer, Whirlpool-Seeger Corporation  
St. Joseph, Michigan

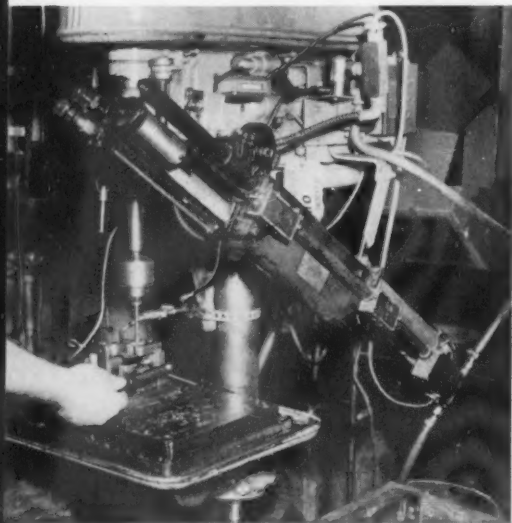
**Efficient setups and high-speed tools are essential** in the St. Joseph, Michigan, plant of Whirlpool-Seeger Corporation, where several thousand home automatic washing machines and dryers

are manufactured each day. High-speed precision drilling of components has been expedited by setups devised in the factory for use with standard drill presses.

Pneumatic clamping and feeding enable an operator to easily maintain an output of 1,700 drilled shafts per hour. Shafts are  $\frac{5}{8}$  inch in diameter by  $5\frac{5}{8}$  inches long and require a  $5/16$ -inch hole located near one end.

**A simple fixture is used** with a pedestal-mounted 17-inch Delta drill press. The operator places the work in a vee-block and then pushes it axially until the piece trips an actuating switch when in proper position. Closing the switch operates a solenoid that admits air to a cylinder, lowering a locking lever above the shaft to be drilled. The lever holds the piece firmly in the block.

Simultaneously air is admitted to



**Delta drill press fitted with Bellows feed and special air-operated locking fixture enables Whirlpool-Seeger to drill 20 washing machine shafts a minute. Fixture locates hole and holds workpiece during drilling operation.**



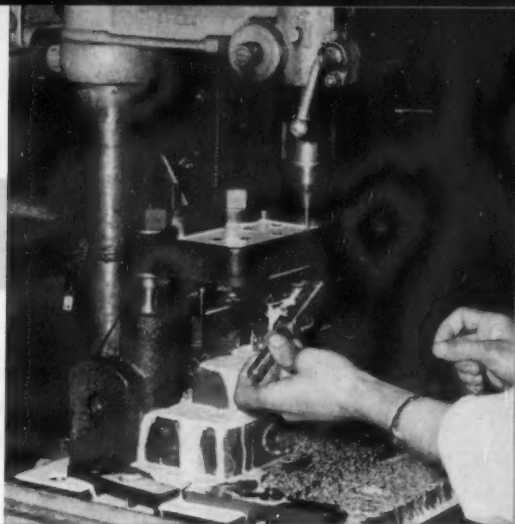
# Shafts

actuate the Bellows feed of the Delta drill press, advancing the twist drill to the required depth and automatically retracting it. Feed is maintained to provide maximum production and minimum drill wear. The locking lever is released as the twist drill is retracted. Operators thus are able to feed the machine with the right hand and remove finished work with the left.

In another operation, hand-fed 14-inch Delta drill presses are used. A  $\frac{1}{8}$ -inch hole is required at 90 degrees to a slot in the end of a shifter shaft.

**To insure precise location of the hole,** a fixture with a die set holder is used with the bench-mounted drill press. The upper half of the holder has a flat tongue over which the shaft slot is fitted. The shaft is pushed against a stop that locates the holes at a constant distance from the end.

This drill press is operated manually. Output is 400 pieces an hour, which is lower than the production of the automatically-drilled shafts previously described, but sufficient to meet factory requirements.



*Hand-fed drilling operation on shifter shaft in Whirlpool-Seeger plant utilizes shop-built locating die set fixture. Slotted end of piece is placed in tongued top of fixture that locates hole at 90 degrees to slot.*



*The shifter lever presses against a stop that maintains the correct position of the drilled hole along the length of the shaft. Drill press is manually operated. The output with this particular setup is 400 pieces per hour.*



## ESSENTIAL ELEMENTS OF

# Thread and Form

**In this second installment of a three-part article, the author continues his discussion of types of equipment available for thread rolling.**

By CLIFFORD T. APPLETON

Vice President, Reed Rolled Thread Die Company

**Rotary planetary machines** have one central rotary die on a fixed axis and one or more stationary concave segment dies located to the outside of the rotary die as shown in Fig. 7. The starting end of the segment die is set so the segment and

rotary dies will just contact the blank. The finishing end of the segment die is set closer to the axis of the rotary die so the thread is fully formed when the blank rolls past the finish end of the segment die. One or several blanks may be roll-

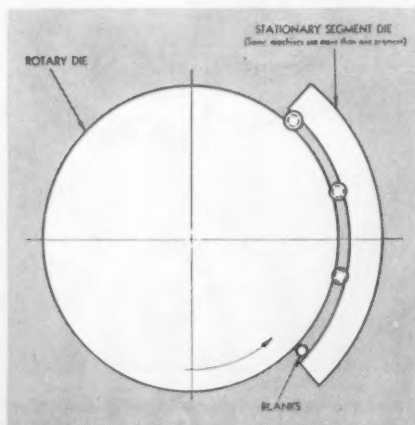


Fig. 7—Rotary planetary machines have one central rotary die on fixed axis and stationary concave segment dies located as shown.

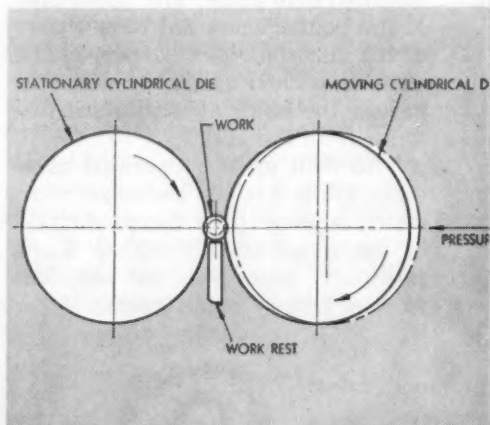


Fig. 8—Two cylindrical-die machines have two opposed dies on parallel axes; blank to be rolled is supported on rest between dies.

# Rolling

ed in a segment die at one time, dependent upon the setup. There is no axial movement of the blank during rolling.

## Cylindrical Die Machines

Cylindrical die machines have a wide range of speeds and feeds, and are widely used for in-feed rolling with no axial movement of the blank during rolling. Since the dies are circular in shape, there are no limitations on the number of revolutions provided for the rolling of a thread or the rate at which the dies feed into the work. Cylindrical die machines are made with two or three dies, and the three die machines have diameter capacities exceeding 4 inches.

Two cylindrical die machines have two opposed dies mounted on parallel axes and the blank to be rolled is supported on a work rest between the dies, as shown in Fig. 8. The dies rotate in the same direction. The axis of one die is stationary and the axis of the other die moves toward the axis of the stationary die to roll the thread on the blank. The moving die then recedes to release the threaded blank. The diameter of the finished thread is controlled by the size of the blank,

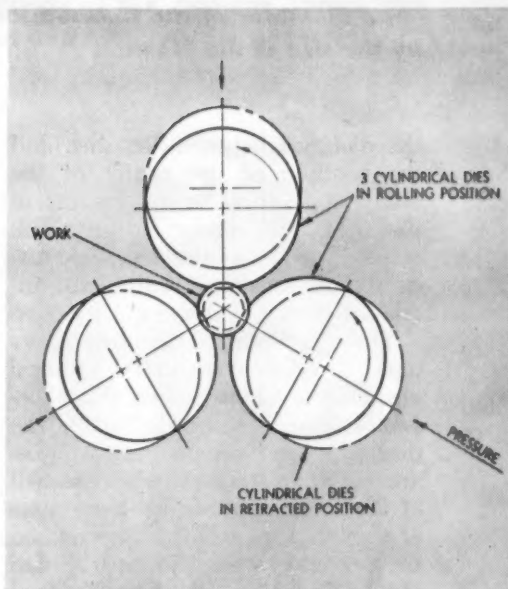


Fig. 9—Three cylindrical-die machines have three dies equally spaced around the blank which floats between them, as shown in this drawing. The dies are mounted on parallel axes and rotate in the same direction.

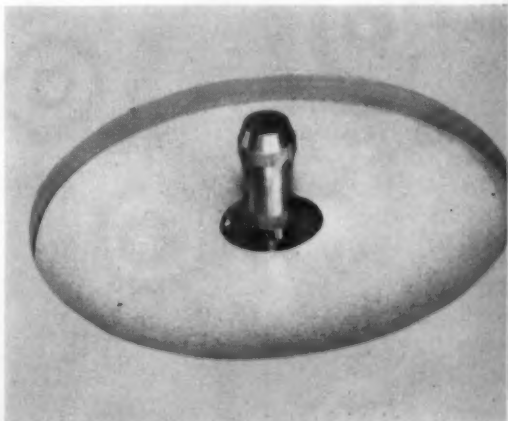


Fig. 10—A vertical type cylindrical die machine arranged to automatically lower and raise the part for ease in handling.

**"The diameter of the finished thread is controlled by the size of the blank . . ."**

the distance between the dies and the position of the center of the blank in relation to the centers of the dies. The center of the blank raises from the stationary work rest as the diameter of the blank increases during rolling.

Three cylindrical-die machines have three dies equally spaced around the blank which floats between them, as shown in Fig. 9. The dies are mounted on parallel axes and rotate in the same direction. All of the dies move toward the center of the blank to roll the threads and then recede to release the threaded blank. The diameter of the finished thread is controlled by the size of the blank and the distance existing between the three cylindrical dies.

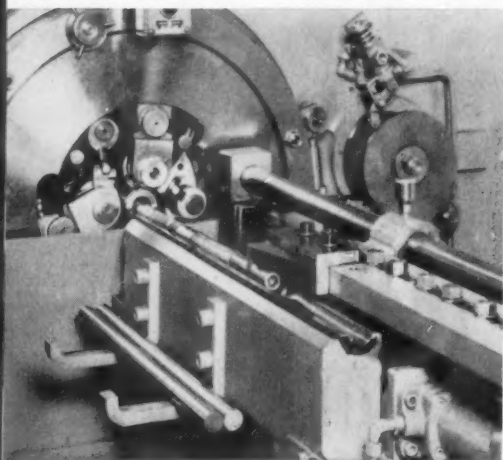
Both types of cylindrical die machines can be adapted to feed blanks axially which is known as thru-feed rolling. However, the three die machines can feed either hollow or solid blanks through the dies.

Figures 10, 11 and 12 show a few applications of cylindrical die rolling machines.

### **Thread Rolling on Screw Machines**

Rolling threads on screw machines and automatic lathes is most commonly done with attachments using one or two thread rolls. When rolling with one thread roll, the pressure is usually directed against the spindle and the blank. With two opposed rolls that form the thread between the rolls as they straddle the blank, the direct pressure on the spindle and blank is reduced to approximately 15 per cent of the pressure exerted by one roll. Consequently, there is less spring of the blank and reduced wear on the spindle bearings when using two rolls.

With a single roll feeding directly toward the center of the blank, the size of the finished thread is controlled by the size of the blank and the final positioning of the cross slide which determines the center distance between the roll and the blank at the time of completing the



**Fig. 11—Self-indexing fixture for multi-position rolling and serrating on shafts.**

**"... general specifications of the dies are dependent on the equipment and attachments selected ..."**

thread, illustrated in Fig. 13.

Attachments with two rolls usually have two opposed thread rolls which, form the thread between the rolls as they straddle the blank, final size of the thread being obtained when the rolls are on the center of the work as shown in Fig. 14. The size of the finished thread is controlled by the size of the blank and the fixed setting of the rolls in the attachment. The cross-slide travel is only used as a means of supplying movement to the rolls.

Applications of the thread rolling attachments are shown in Figs. 15, 16 and 17.

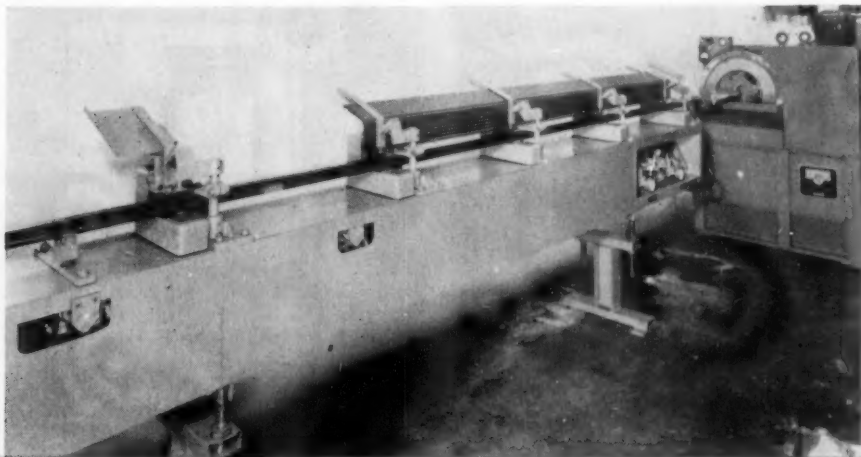
#### **Thread Rolling Dies**

The general specifications of the dies or thread rolls are dependent on

#### **The Author**

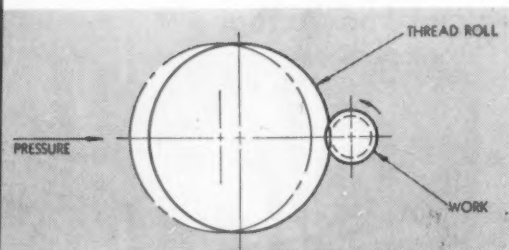


**CLIFFORD T. APPLETON, Vice President, Reed Rolled Thread Die Company**



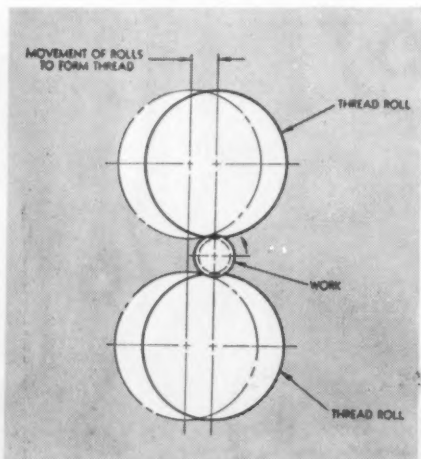
**Fig. 12—This illustration shows a horizontal type thread rolling machine which is equipped with an automatic bar feeder and a discharge mechanism.**

**"It is well to remember that . . . precision-made dies are always more economical to use."**



**Fig. 13—Drawing showing thread rolling in a screw machine using a single roll.**

the equipment and attachments selected for the job. The particular design of the dies or rolls, however, is determined according to the method of processing and the specific details of the work. Shoulder diameters on the work should be checked

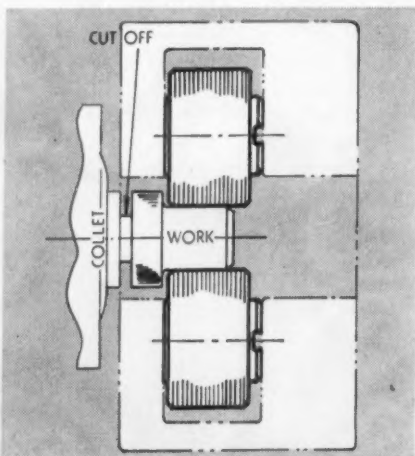


**Fig. 14—Drawing showing thread rolling in a screw machine using two thread rolls.**

for clearances with machine and tooling selected. Auxiliary work holding or supporting fixtures should also be considered where the nature of the work at hand demands such tooling.

Under ordinary conditions each thread diameter and pitch requires a set of dies or rolls made especially for the diameter and pitch specified. The same dies or rolls are not used for different diameters of the same pitch.

It is well to remember that even though the threads to be rolled do not necessarily have to be held to close limits, precision-made dies are always more economical to use. Accurate dies can be set up more quickly and more precisely, with the re-



**Fig. 15—Rolling straight type threads on the outboard end of a piece of work.**



**"Accurate threading requires dies that have accurate thread form and lead, straight pitch lines and accurate lead angles."**

sult that not only is down time reduced, but the life of the dies is also increased.

**For precision threading,** precision-made dies are absolutely essential. Accurate threading requires dies that have accurate thread form and lead, straight pitch lines and accurate lead angles. In the case of flat dies, the reliefs at the ends of the stationary die should be parallel with the axis of the work blank. The thread form of the reliefs should be as accurate as the form on the face of the die and should be correctly blended with it. Flat dies should be precisely matched.

The width of face on a die or thread roll is very important. The proper face width and the correct

bevels on the dies not only prevent chipping of the end threads or breakage in the dies, but determine the number of settings possible for rolling on the face of the die.

The width of the die or thread roll faces for in-feed rolling must be always greater than the length of thread to be rolled. The amount the die face is greater than the length of the thread is dependent on the nature of the thread, design of the die and other factors determined by experience with rolling. Refer to Fig. 18.

The next, and concluding, installment in this discussion of essential elements of thread and form rolling will be published in the following issue of this magazine. After read-

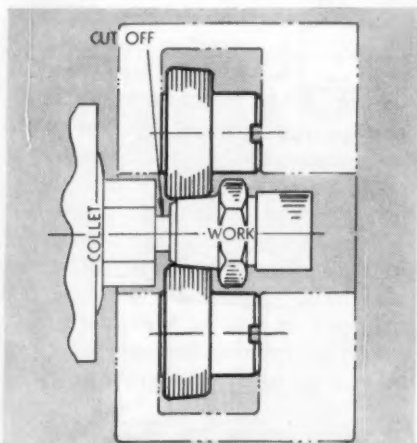


Fig. 16—Rolling taper pipe threads behind a shoulder on the collet end of a workpiece.

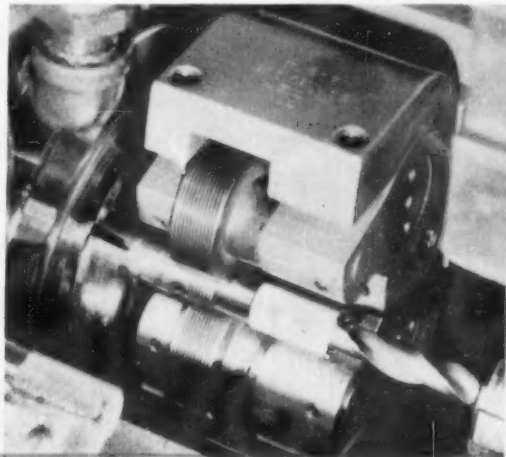


Fig. 17—Illustration showing threads being rolled behind shoulder as piece is drilled.



## Thread Rolling . . .

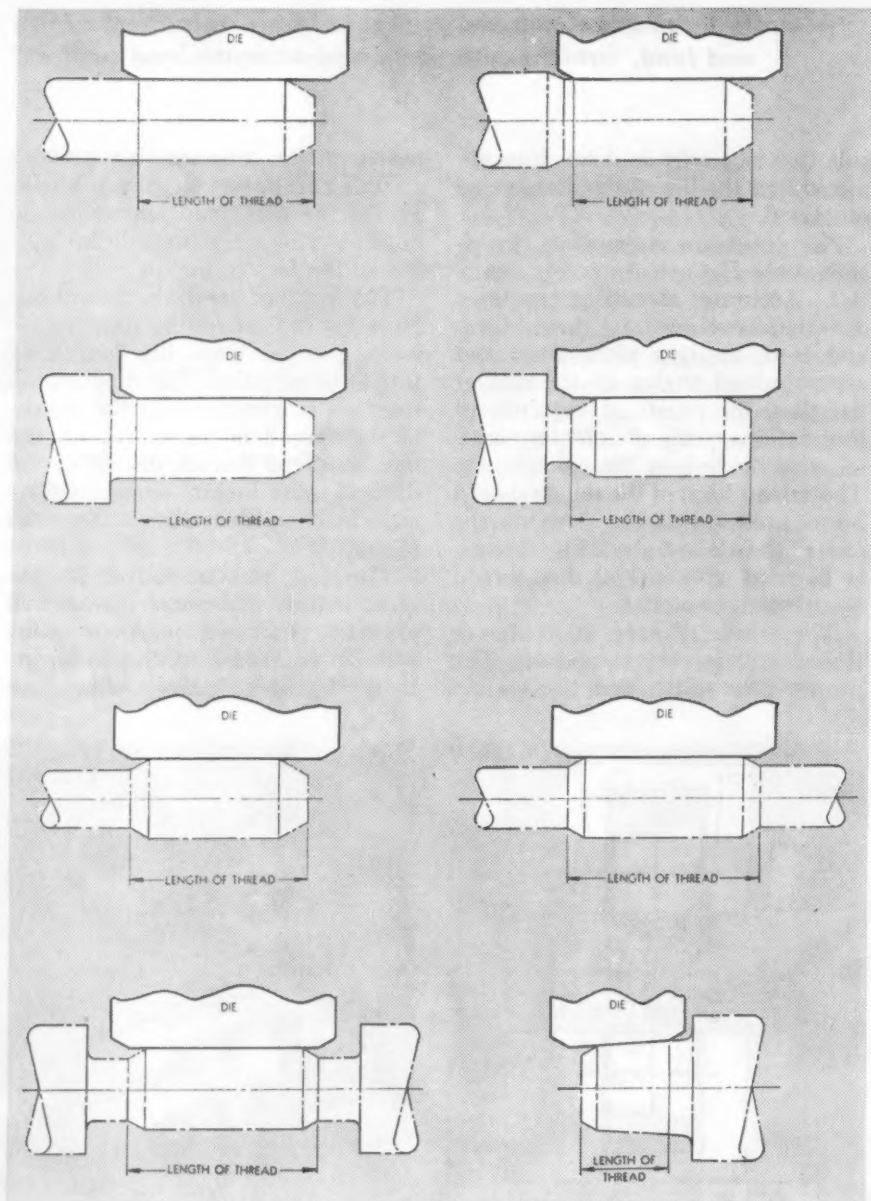


Fig. 18—The width of the die or thread roll faces for in-feed rolling must be always greater than the length of thread that is to be rolled, as shown in this drawing.

ing, may we suggest that you clip and save these articles for future reference purposes.

★ ★ ★

### High Temperature Technology.

Edited by I. E. Campbell, Battelle Memorial Institute. Published by John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y. 526 pages. Cloth binding, board covers. Price, \$15.00.

In this latest addition to Wiley's Electrochemical Society Series, thirty-five authorities combine to summarize recent developments in the field and to clarify the research of engineers, metallurgists, ceramists, and chemists working to develop new materials of construction for service at very high temperatures. In the first major section of the book—"Materials"—the authors cover metals, oxides, properties of carbon and graphite at high temperatures, carbides, borides, silicides, nitrides, sulfides, and cermets.

Part II—"Methods"—deals with sintering of metallic and nonmetallic refractory materials, means of achieving high temperatures and some of their limitations, resistance and induction-heated furnaces, arc furnaces, and other methods of achieving high temperatures. The last section—"Measurements"—includes temperature and its measurement, mechanical properties, physical properties, and data on special techniques.

The individual contributors to "High Temperature Technology" are H. N. Baumann, John M. Blocher, Jr., W. R. Buessem, J. D. Co-

bine, W. M. Conn, Paul H. Dike, R. F. Domagala, G. B. Eyerly, G. H. Fetterley, R. F. Geller, John W. Graham, Edward C. Henry, E. W. Hogue, W. R. Kiessel, W. E. Kuhn, W. A. Lambertson, S. M. Lang, J. R. Lee, H. S. Newhall, C. F. Powell, John C. Redmond, L. D. Richardson, Sr., Roger J. Runck, F. Schossberger, R. L. Seifert, V. M. Sheip-line, E. M. Sherwood, M. J. Sinnott, J. A. Stavrolakis, Gary Steven, J. A. Upper, Ralph Wehrmann, D. A. Wilbur, D. R. Wilder, and M. S. Wright.

★ ★ ★

### Correction

On Page 131, line 5, of the April issue is shown a grinding wheel designation as follows: 32A36-H12VBEP. This designation applies to a Norton Grinding Wheel manufactured by The Norton Company, Worcester 6, Massachusetts.



# THE QUEST FOR THE **ONE** BEST WAY



***A thought-provoking review of the many factors which influence the cost of a product and which frequently are beyond the control of an operator.***

By W. A. NORDHOFF

**It can be reasonably assumed that man's material progress** since he climbed out of the tree to walk erect upon the land can be attributed to his search for better ways of doing things. The Folsom spear of 25,000 years ago was an improvement over the sharpened stick. It extended man's reach. The atlatl multiplied the force of his arm. The catapult, the cannon, the airplane, the missile are other and improved extensions of his arm which enabled him to deliver greater blows. The wheel was a marked improvement over the skid.

When the pyramids and the sphinx were built, engineering methods must have undergone some refinements over previous engineering practices.

Finding the best way to perform a task usually means an assault upon the present way of doing it. It often results in reducing the number of physical motions required to do a job and making more effective those

motions which are used. It also involves reducing, as far as possible, the time in which certain body members are idle while others are doing useful work.

The critical analysis of the physical movements required to do a job is only one step in the direction of finding "the one best way." It is important but not all inclusive. There are other avenues leading to improvements which should be considered when searching for the best method. Improved machine tools, better cutting materials, proper raw stock, the use of a variety of material shapes, more thoughtful designing, and planning also play important roles in a cost-reduction attack on a job.

There are many ways to do a job. A job can be done—even the wrong way. *Because of some quirk in man's mental processes, he usually selects one of the more difficult ways to do a job.* He rarely chooses "the one best way" first. Because of this, one

is most safe in assuming that all jobs can be improved.

### Rules of Work

There are quite a number of rules of work which can be applied to any job. The way a job measures up to these rules indicates the effectiveness of the methods employed. The following are some of the rules:

*1. Is the operation necessary?* This is perhaps the first question one should ask of any job. Certainly no production is accomplished by performing an unnecessary operation. It may be entirely possible to eliminate an operation by an improvement in method, by a change in design, or by a change of material.

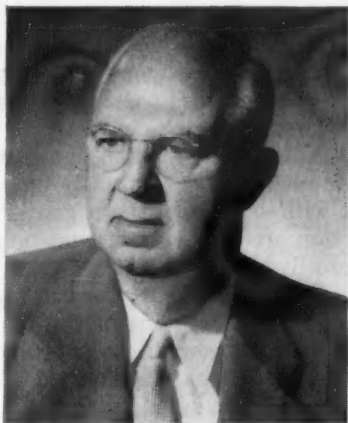
*2. Can the operator's hands be freed of holding?* The hand is the poorest and certainly a most unsafe holding device. The most elementary tool devised for holding is superior to the hand on any job.

*3. Would the installation of a foot pedal free an arm or a hand for more useful work?* The old grindstone was equipped with a foot pedal as a matter of fundamental design. There are other machines, not originally equipped with foot pedals, that would show startling increases in production with the addition of a foot pedal.

*4. Is the work being performed in the normal working area?* All the work should take place within a normal working area. When this is done, fatigue is reduced and production is increased.

*5. Can extensive body motions be eliminated?* Motions should be confined to the lowest possible classifi-

### About the Author



W. A. NORDHOFF was born in Peoria, Illinois. He served two years as a radio operator in the U. S. Navy during the First World War. In 1925 he won second prize in the Charles P. Steinmetz Memorial Contest for his essay on one phase of the American organized labor movement. This essay was later expanded into a college thesis. Mr. Nordhoff graduated with a Masters Degree in Economic Science from the State College of Washington in 1925. For the past twenty-five years he has been engaged in industry in the time study and estimating fields. He has appeared as a speaker before several technical societies, with special reference to machine-shop estimating. He has contributed technical articles to both East and West Coast trade journals. He is the author of a book "Machine-Shop Estimating" published by the McGraw-Hill Book Company. He has been in the employ of the Douglas Aircraft Company, Incorporated, for the past sixteen years.

**"When an operator learns to use both of his arms and hands . . . he reduces fatigue."**

cations. Body motions are the most fatiguing. All such motions should be as short as it is possible to make them. When one reaches beyond his normal work area, when one stoops to do his work, he is punishing himself with unnecessary fatigue. Production under these circumstances naturally suffers.

6. *Can the job pass the balanced-motion test?* Motions of the hands and the arms should be continuous and made at the same time and in opposite and symmetrical directions. When an operator learns to use both of his arms and hands in this manner, he reduces fatigue. Production benefits.

7. *Does the job have rhythm?* Most jobs have a rhythmic pattern

which will need to be discovered and felt by the operator. *Once he gets the rhythmic feel of the job, he will be carried along with it at a faster pace and with less fatigue.*

8. *Is the natural rhythm of the job broken at some point by hesitation on the part of the operator?* If the rhythm of a job is broken and is caused by some hesitation on the part of the operator, it should be analyzed and studied, its causes be accounted for—and eliminated.

9. *Can two or more be produced at one time?* The principle of producing more than one at a time is seen in a multiple-spindle drilling operation where several holes are drilled simultaneously. Making several cuts by gang or multiple milling is another example of producing two or more at one time. The stacking of parts for machining is a simple and an often present method for vastly increasing production.

A corollary to the above rule would be: Can the operator run more than one machine at a time? Automatic and semi-automatic machines are designed with this principle in mind.

When the machining time is vastly greater than the loading and unloading time, the ability of the operator to run more than one machine is great. A few machines which lend themselves to such economy of manpower are planers, gear shapers, spline and serration hobbors, thread mills, and power hack saws.



*"Because of some quirk in man's mental processes, he usually selects one of the more difficult ways to do a job."*



***"Most checking can be accomplished after the part has been removed from the machine . . ."***

10. *Can the operation be combined with another?* There are many instances where production can be increased by combining operations. The simultaneous operations of the cross slide tools and the hexagon turret tools on a turret lathe is one example.

The necessary deburring of parts, certain make-ready elements can often be done during a machining element. Most checking can be accomplished after the part has been removed from the machine and another is being run.

11. *Are the tools and the materials used on the job prepositioned?* When tools and materials are prepositioned like a towel on a towel-rack or a cake of soap in a soap-dish over the lavatory, we can make use of them with our eyes closed. In a similar manner, materials and tools should have fixed work positions to facilitate our working with them. This reduces the search, find, and select therbligs.

Gravity-feed bins should be employed to deliver assembly components in front of an operator and close to the point of their use. The parts should be in separate chutes so the operator will not be required to make an assembly from a jumble of mixed-up parts. The parts should be arranged so they can be slid to the point of assembly.

12. *Is the job set up for drop delivery?* The quickest way to get rid of a completed part is to drop it. It

is quicker to drop a part than it is to transport it horizontally — even for a short distance.

13. *Are the production tools equipped with ejectors and quick-acting clamps?* Air-operated chucks and fixtures can be loaded and unloaded in less time than conventional hand-operated chucks and fixtures. It takes time to prepare a part for work and to dispose of it after work. The time that is saved on these two non-productive elements allows more time for the productive work element.

14. *Are operations being performed manually which can be done better, faster, and with less fatigue by a machine?* By definition, a machine is a tool designed to lighten the la-



*"Once he gets the rhythmic feel of the job, the operator will be carried along with it at a faster pace and with less fatigue."*



*"... down time can be reduced if loading and unloading of the parts are accomplished during machining ..."*

bor of man. It should be employed, wherever possible, to serve that end.

### **Machine Tools**

Once we have employed reasonable work habits in the dispatch of our normal work functions, we can then turn our attention to machine tools and their processes. We should start by asking: Is the machine tool the right one for the job? Also, is the machine tool operating at its designed capacity?

*The weakest—and the strongest—link in machine performance is the operator.* For a machine tool to deliver its best performance it must be intelligently operated. To evaluate the effective use of machine tools, we should ask such questions of each machining operation:

1. *Can the operator keep two or more machines producing at one time?* Automatic screw machines, power hack saws, gear-cutting machines, and others lend themselves to this type of operator control.

2. *Can the parts be stacked for simultaneous machining?*

3. *Can more than one cutting tool be operated at the same time?* Straddle mill operations, multiple spindle drill press work, hexagon turret and cross slide tools working together are examples of cutting tools operating economically.

4. *Can multiple setups be made to machine several parts at once?* This particular question refers to parallel machining operations.

5. *Are the spindle speeds in keeping with the machinability of the material and the quality of the cutting tools?*

6. *Would duplicate production tools (vises, fixtures) increase production?* The down time of a machine can be reduced if the loading and unloading of the parts are accomplished during the machining element.

7. *Can the parts be stacked for tandem machining?* This type of machining operation saves the time required for the approach and the overrun of cutters on all parts above one.

8. *Can the next operation be performed on the same machine with only minor setup adjustments?* Second and subsequent operations



*"There are many instances where production can be increased by combining operations."*

**"The higher-priced operator should not be doing the work which a lower-priced operator can do."**

should be done, as far as possible, on the same machine on which the first operation was performed. This gives the operator the opportunity to make use of some of the tools employed on the immediately preceding operation. Often only minor adjustments of the cutting tool and the holding fixture are required to perform the next operation.

9. If one of a series of milling operations on a part is done on a universal head (tip-head) mill, could all or more of the operations be done on a universal head machine to avoid moving the part from one machine to another? It is more costly to move from machine to machine to perform milling operations than it is to perform a series of operations on the same machine by merely adjusting

the angle of the cutter on a universal head machine.

10. Although the lot sizes are small, can several lots be tumble-deburred successfully? Another effective use of a machine tool is the loading of a tumbling barrel with a variety of dissimilar parts when job-lot sizes are small. The several parts can be separated with little added effort at the end of the deburring operation.

11. Can the job be done as well by a person having a lower labor grade? The higher-priced grade-1 operator should not be doing the work which a lower-priced grade-3 operator can do.

12. Would it pay to employ a set-up man to set up a number of machines and then use lower-skilled operators to run them? It often happens that the setup of a machine is the only portion of a machine operation which requires skill. Once the machine is set up and the operator is properly instructed, an operator of a low labor grade can run the machine and produce the parts as effectively as an operator with a higher labor grade.

13. Could the part, or the operation, be subcontracted to another shop having more specialized equipment and more know-how at less cost than it can be produced in your own shop with its inadequate facilities? The average shop is in no position to adequately compete with specialists in the manufacture of



**"The weakest—and the strongest—link in machine performance is the operator."**

## The Quest for the One Best Way . . .



"It is more costly to move from machine to machine to perform milling operations than it is to perform a series of operations on the same machine by adjusting the angle of the cutter on a universal head machine."

springs, ball bearings, hydraulic parts, electrical assemblies, and so on. *Editor's Note: This article will be continued in the next issue. Be sure to look for it.*

★ ★ ★

**Standard and Simplified Drafting Practices.** Published by American Foundry Co., 261 Madison Ave., New York 16, N. Y. 65 pages. 8½ by 11 inches.

The first section of this publication contains a speech on this provocative subject as given by Jay H. Bergen, AMF Standards Adminis-

trator, before the American Society for Engineering Education. The remaining 44 pages are devoted to the details of AMF standards on Drafting Room Practice and Simplified Drafting.

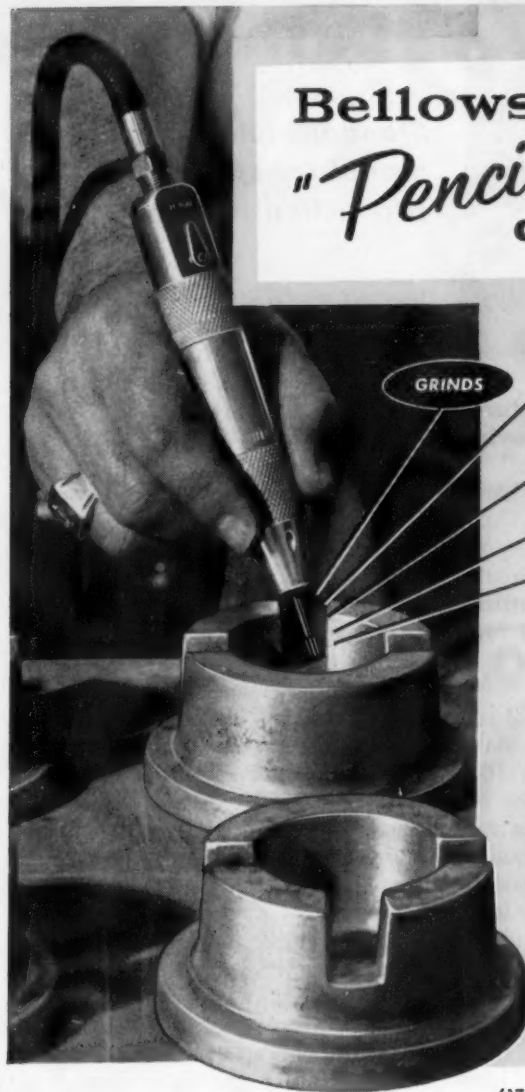
The ASEE speech quotes the results of a comparative test made at the AMF Buffalo Plant between standard and simplified drafting practices and concludes with the statement, "... Many people in industry including myself feel that the schools must teach what we consider to be standard drafting practices before a student is taught simplified practices. I feel that simplified drafting is a supplement and not a replacement for present-day practices."

The 44 pages of details on traditional and simplified drafting procedures show how AMF has put into practice author Bergen's "supplement" philosophy. The 20 pages devoted to Standard Drafting Room Practice, as recently revised, cover in a comprehensive yet simple manner all basic drafting operations and then conclude with four pages of helpful data pertaining to general drafting procedures.

The final 24-page section on Simplified Drafting starts out with the 11 rules as covered in detail by Mr. Bergen in his widely circulated booklet, "Simplified Drafting," and then goes into the details of simplified practice.

Those interested in obtaining a free copy of this booklet may write on company letterhead to: Public Relations Department, American Machine & Foundry Co., 261 Madison Ave., New York 16, New York.

# Bellows "Pencil-Size" GRINDER\*



GRINDS

DEBURRS

POLISHES

CUTS

ENGRAVES

Air powered—100,000 RPM. No shop can afford to be without this fast, flexible, low cost tool.

It grinds, deburrs, cuts, polishes, engraves. Ideal for precision finishing. Fits your hand like a pencil—responds as easily.

Weighs only 5¼ ounces. Has only one moving part—the lightweight aluminum rotor. Operates on 80 to 100 pounds of air line pressure. Takes cutting tools of any diameter up to ¼" (⅛" shank). Comes complete with Bellows Lubri-Air Filter and Lubricator, 6' of flexible nylon reinforced air hose.

617-B

\*Patent Pending

Write for free bulletin today!  
Address Dept. MMS-856, The Bellows Co.,  
Akron 9, Ohio. In Canada: Bellows  
Pneumatic Devices of Canada, Ltd., Toronto, Ont.

**The Bellows Co.**  
AKRON 9, OHIO

For more data circle 295 on Reader Service Card

August, 1956

modern machine shop 125

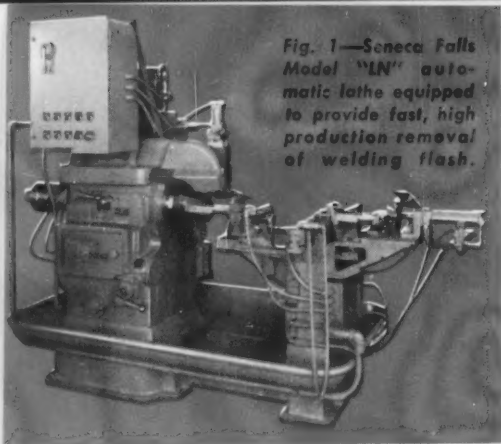


Fig. 1—Seneca Falls Model "LN" automatic lathe equipped to provide fast, high production removal of welding flash.

**An automotive manufacturer had the problem of removing welding flash** on a worm shaft assembly on a high production basis. The Seneca Falls Machine Company solved the problem by equipping its new Model "LN" automatic lathe with certain standardized units to provide a specialized high production machine, as shown in Fig. 1.

The upper diagram in Fig. 2 is a schematic view of the automatic work handling equipment. Welded parts are delivered to the lathe red hot directly from the welding machine by a conveyor, which joins the loading chute, and flow by gravity to the fixed stop, which is the loading position. On the completion of a finished turned part, the spindle stops, the hinged steady rest roll carrier is retracted, the collet chuck opens and the finished piece is ejected from the collet by a spring loaded ejector rod. The part is deposited on the unloader arms, which immediately swings the finished piece into the discharge chute and then returns to the receiving position.

At this point, an elevator assembly raises a rough piece over the

## Lathe Setup

**Standard lathe is automated for specialized production job.**

loading chute stop into the loading cradle which remains in the raised position until the part is injected into the collet chuck by the pneumatically-operated plunger. The collet chuck closes immediately, the elevator assembly retracts, the hinged steady rest roll carrier automatically closes, the headstock spindle clutch is engaged, the tools on the overhead slide advance to the cutting position, the flash is removed and burnished, after which the tools retract and a new cycle begins.

The lower diagram in Fig. 2 shows the method of holding and driving the part in a collet chuck and also the location of the insert-type carbide tool used for removing the hot flash. The burnishing roll also shown is used to smooth and evenly match the junction of the welded parts.

The entire loading, machining and unloading operations are entirely automatic; however, push-button controls are installed for the manual operation of each movement. The loading cycle cannot get out of time since the automatic sequence is controlled by a system in which each movement is initiated by the completion of the preceding movement. A production of 275 pieces per hour is readily obtained with the use of this equipment.



# for Removing Welding Flash

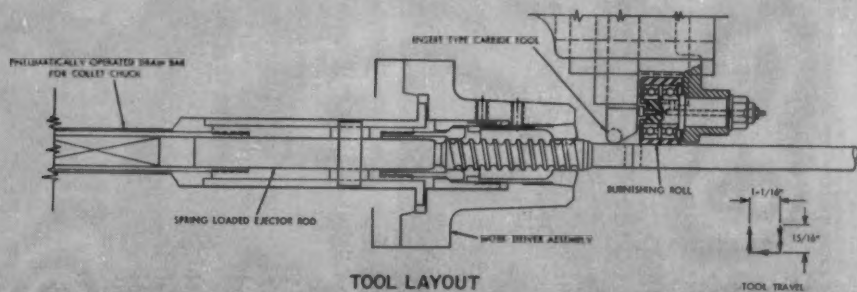
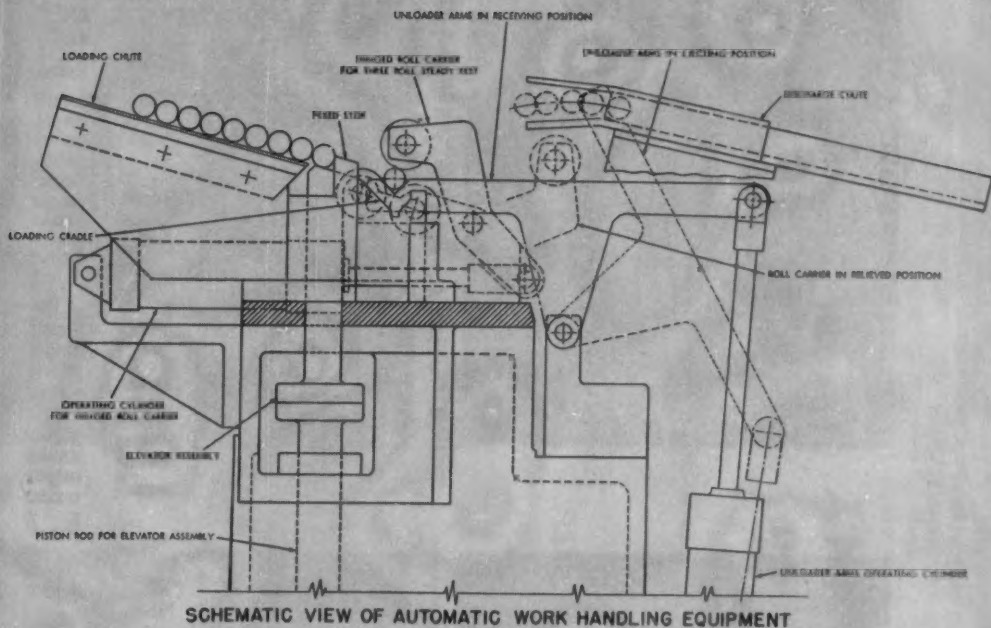
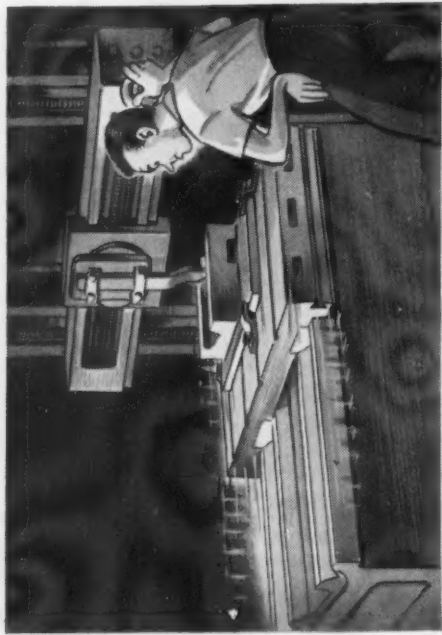


Fig. 2—(Above) Schematic view of automatic work handling equipment used with lathe. (Below) Diagram showing method of

holding and driving the part in a collet chuck and also the location of the insert-type carbide tool used for removing the hot flash.





**1. Cures "stick-slip" or "jumpy table".** When a table gets the "shakes", especially after it has just reversed or when the load is heavy and the speed slow, it's probably suffering from "stick-slip". Remedy—Sunoco Way Lubricant®. Special polar compounds in Sunoco Way Lubricant form a friction-reducing film that keeps a table sliding smoothly under all operating conditions.

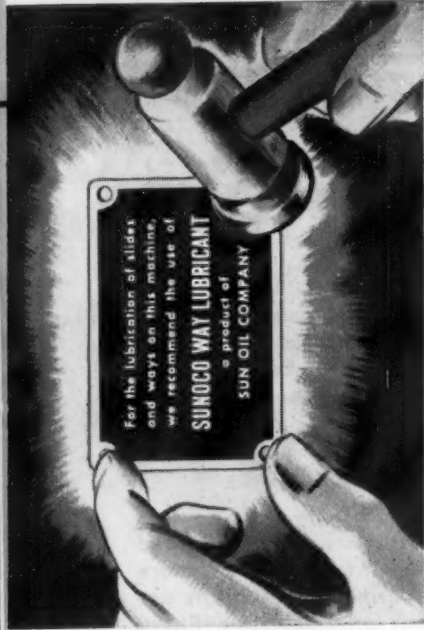


**2. Doesn't squeeze out.** When you use a heavy oil as a way lubricant, you must use a lot of oil to maintain a thick enough film. But, heavy oil squeezes out if the table sits in one position very long. You have a tough time getting the table moving again. Protected by the tenacious thin film formed by Sunoco Way Lubricant, the machine can be idle for a week and it will start easily.

## WHY SUNOCO WAY LUBRICANT CAN HELP CURE YOUR MACHINING PROBLEMS



**3. Protects expensive ways.** Badly scored or pitted ways, caused by inadequate way lubrication, result in lost production and expensive repairs. The high film strength of Sunoco Way Lubricant eliminates the danger of metal-to-metal contact, the chief cause of scoring and way wear. Excellent metal-wetting and non-corrosive properties eliminate rusting and pitting.



**4. Approved by more than 55 machine-tool builders.** Every major machine-tool builder has tested Sunoco Way Lubricant. It is always approved. In fact, to assure maximum efficiency of their product, many manufacturers ship a supply of Sunoco Way Lubricant with each machine. We'll be glad to send you the list of manufacturers who have approved Sunoco Way Lubricant.

For more information, see your Sun Representative, or write SUN OIL COMPANY, Philadelphia 3, Pa., Dept. MM-8.

INDUSTRIAL PRODUCTS DEPARTMENT

**SUN OIL COMPANY**

©SUN OIL CO.

PHILADELPHIA 3, PA.

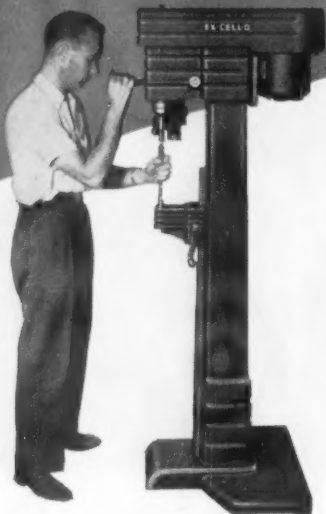
IN CANADA: SUN OIL COMPANY LIMITED, TORONTO and MONTREAL

For more data circle 237 on Reader Service Card



# Precision Lapped Centers

## Reduce Your Costs

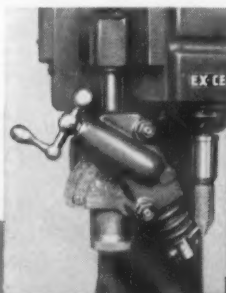


A quick, easy center lapping operation on a precision-built Ex-Cell-O Center Lapping Machine prepares your work for dimensional accuracy between centers—insures centers that are round, in line and have the correct angles.

When parts are center lapped subsequent machining is more accurate; grinding rejections are minimized; and selective fitting time is abolished. That's why an Ex-Cell-O Center Lapping Machine will pay for itself quickly in your shop.

A sturdy base and column support the motor and precision spindle on Ex-Cell-O Center Lapping Machines. Note adjustable work rest. Scraped ways assure perfect alignment of work rest center with spindle.

Contact your Ex-Cell-O representative or write for center lapping bulletin.



A sharp, accurate 60° point is maintained on the lapping stone with a spindle-bracket-mounted diamond dresser. (Adjustable dressers for other angles are available.) Dresser swings out of the way when not in use.



56-4

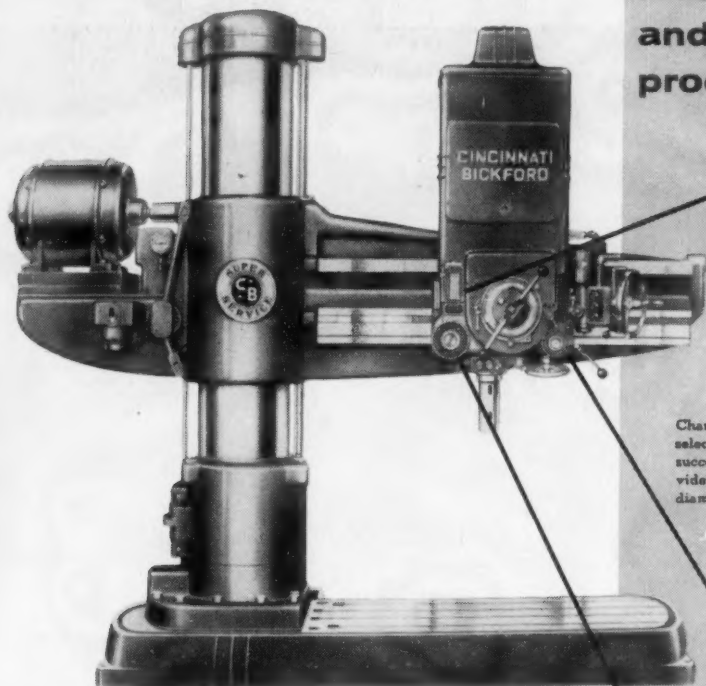
**EX-CELL-O  
CORPORATION**

DETROIT 32, MICHIGAN

MANUFACTURERS OF PRECISION MACHINE TOOLS • GRINDING SPINDLES • CUTTING TOOLS • RAILROAD PINS AND BUSHINGS • DRILL JIG BUSHINGS • DAIRY EQUIPMENT • AIRCRAFT AND MISCELLANEOUS PRODUCTION PARTS

For more data circle 298 on Reader Service Card

# HEAD WORK... saves time ...controls and speeds production!



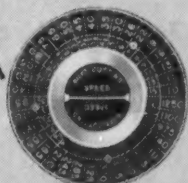
24" VEE DRILLING CHART

DRILL DIA.	FEED	SPEED
1/2"	0.010	1000
3/4"	0.012	800
1"	0.015	650
1 1/4"	0.020	500
1 1/2"	0.025	400
2"	0.030	320
2 1/2"	0.040	250
3"	0.050	200
3 1/2"	0.060	160
4"	0.075	125
4 1/2"	0.090	100
5"	0.100	90
5 1/2"	0.120	80
6"	0.150	70
6 1/2"	0.180	60
7"	0.200	50
7 1/2"	0.250	40
8"	0.300	35
8 1/2"	0.350	30
9"	0.400	25
9 1/2"	0.450	20
10"	0.500	18

Chart guides the operator in pre-selecting speeds and feeds for succeeding operations. It provides a permanent record of tool diameter, speed and feed.



Hydraulically pre-selects all 18 feeds. Positive geared tap leads and feeds are quickly pre-set.



Hydraulically pre-selects all 36 speeds. Speeds and tool diameters are shown in large easy to read figures.

This NEW modern head gives an accelerated production and an increase in accuracy of performance ... the greatest advance in simple and positive control in Radial Drill history.

Two convenient direct reading dials control the automatic shifting of sliding gears. While the tool is cutting, merely set the dials to the speed and feed for the next operation. As the spindle is stopping for inserting the next tool, the shifting is done hydraulically ... directly, quietly and quickly. No other operations—no loss of time. Write for catalogs.

**CINCINNATI  
BICKFORD**



RADIAL AND UPRIGHT DRILLING MACHINES

**CINCINNATI BICKFORD DIVISION**  
GIDDINGS & LEWIS MACHINE TOOL COMPANY  
OAKLEY, CINCINNATI 9, OHIO, U.S.A.

# Duplication Turning Eliminates Costly Delay in Aircraft Parts Production



General view of the 16-inch Sidney profile lathe modified by Douglas Aircraft Company for the automatic duplication of odd-shaped parts. Note work blanks in left background.

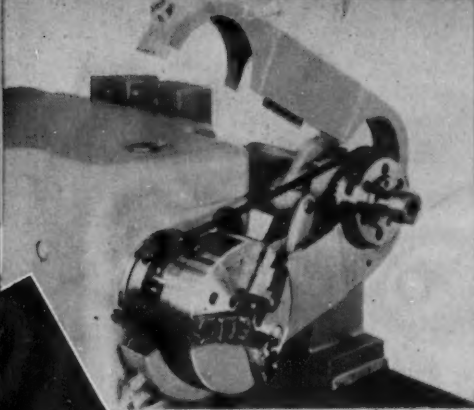
***Douglas Aircraft's El Segundo Division utilizes modified duplicating lathe to automatically reproduce odd-shaped three-dimensional parts from wood pattern.***

By GILBERT C. CLOSE

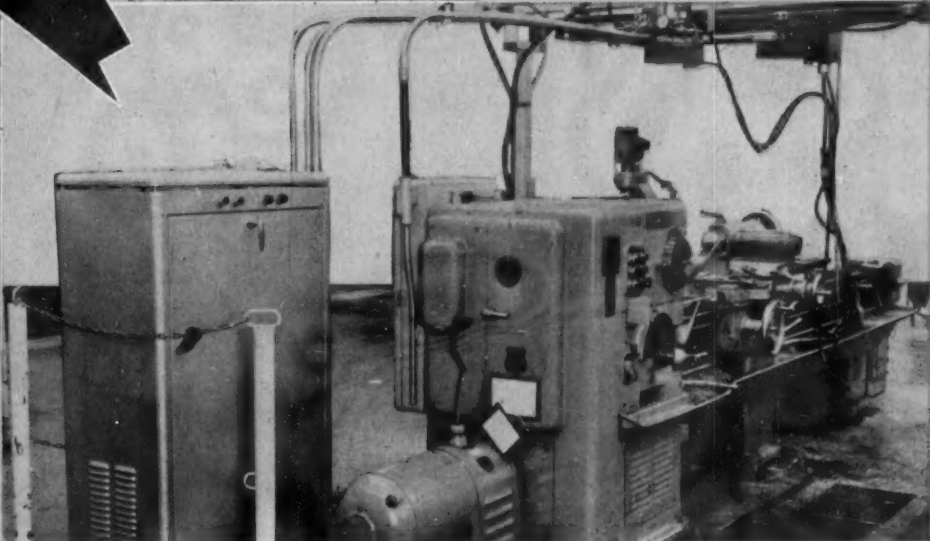
**A duplicating lathe that can automatically reproduce odd-shaped, three-dimensional parts from a wood pattern, a master part, or an ordinary production part is now in operation at the Torrance,**

**California, plant of the El Segundo Division of Douglas Aircraft Company. This machine goes beyond the conventional profiling lathe in that it can reproduce square or oval shapes, or a part including any**





(Left) Motor cycle drive chain installed in order to revolve the off spindle pattern in a 1:1 ratio with the lathe spindle.



(Below) View showing power supply for high-cycle router motor used to drive cutter; also vari-speed transmission installed to reduce lathe spindle speed from 50 to  $\frac{3}{4}$  r.p.m.

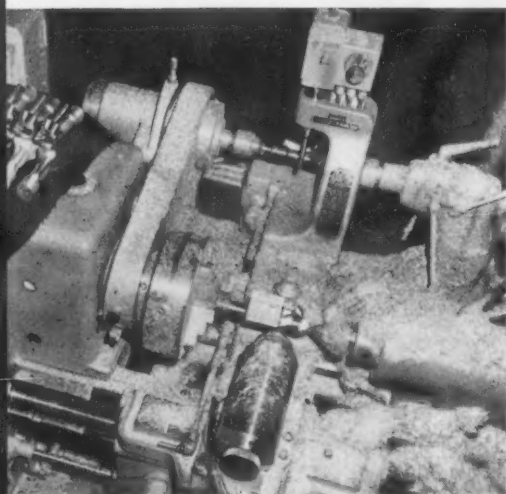
number of odd-shaped protuberances such as cams, ears, lugs, flats, and so on. The duplicates can be held to within 0.002-inch tolerance of the pattern. The method is said to be 50 per cent faster than any similar duplicating technique previously available.

The story behind the development is one of the usual "rush, rush" activity that prevades every airplane engaged in the production of military airplanes. In producing a pro-

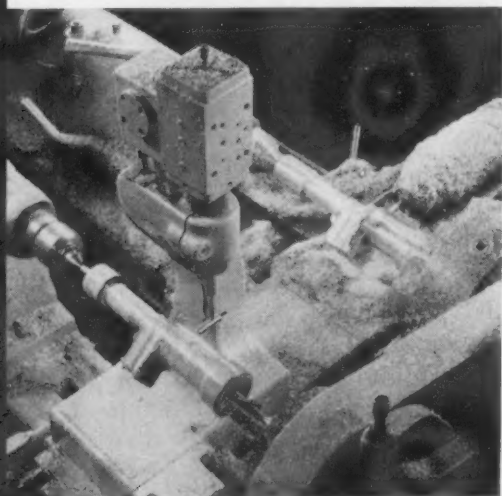
totype airplane, it is often necessary to wait weeks or months for the many small, odd-shaped forgings and castings that go into its make-up. This necessarily delays delivery of the prototype for initial flight tests. The automatic duplicating lathe can produce these odd shapes from solid stock in a matter of hours, and with nothing more than a wood pattern to go by.

Developmental work on the new duplicating lathe started with a





Operator's view of work in progress, producing a substitute forging from square bar in single pass over. Parts just produced are shown on lathe headstock. Two center drill holes in end of each part prevent workpiece from rotating out of phase with wood pattern.



Three-dimensional work on a part. Round portions on the part were turned previously to reduce the time required to duplicate.

conventional 16-inch Sidney profile turning lathe. An automobile-type transmission was installed to reduce the lathe's minimum spindle speed from 50 r.p.m. to  $\frac{3}{4}$  r.p.m. This slow spindle speed was necessary for two reasons—first, to allow the cutter time to remove a large amount of metal in a single pass, and secondly, to give the hydraulic valves in the fluid tracer time to react to a wide range of stylus positions as any delay in valve action would have a direct effect on the duplicating tolerance.

The next step was to evolve some method for turning the off spindle pattern in exact 1:1 ratio with the lathe spindle. This was accomplished by installing an ordinary motorcycle drive chain with sprockets, properly adjusted to eliminate all backlash.

A Douglas-designed and built, heavy-duty, 7 h.p. router motor, operating at 21,500 r.p.m., was installed to drive the rotary cutter. This motor is cooled by an oil mist blown through its frame and rotor structure. The mist ejects around the cutter, thus serving the dual purpose of cooling the motor and finally acting as a cutting lubricant. In heavy cuts, this motor and cutter combination can remove up to  $2\frac{1}{2}$  cubic inches of metal per minute while machining a high-strength aluminum alloy.

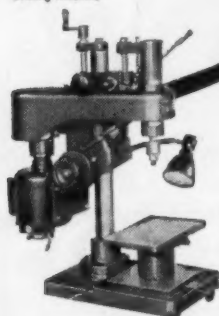
The next step was to design and produce a series of rotary cutters and fluid tracer styli with duplicate end points. The duplicate pairs (cutter and stylus) are always used together. Thus, the same point on the stylus that is contacting the

# precision product?

**EXACT  
HOLES ARE  
IMPERATIVE!**



HAMILTON VARIMATIC®  
Super Sensitive  
Variable Speed  
Small Hole  
Precision  
Drilling Machine



Are you fighting the never-ending battle of trying to produce exact holes on a drilling machine which, itself, is not built to precision tolerances? You are under no necessity to do so. For the difference in price between the cheapest bench type, small hole drilling machine and the Hamilton Varimatic is reckoned in pennies per day. And the Hamilton Varimatic (holes from .004" to 1/4" in all drillable materials) is super sensitive. Provides speeds, infinitely variable, between 840 R.P.M. and 9300 R.P.M. Is built to precision tolerances, and with the stamina to retain precision.

Get prices and specifications without obligation

ASK FOR **FREE** BULLETIN 5408

Address The Hamilton Tool Company  
828 South Ninth Street  
Hamilton, Ohio

**IT'S A**  
**Hamilton Tool**  
USE IT WITH CONFIDENCE

For more data circle 300 on Reader Service Card

**"The high-speed steel cutters used have an average tool life of 120 hours."**

pattern will be accurately duplicated on the cutter as it bites into the workpiece.

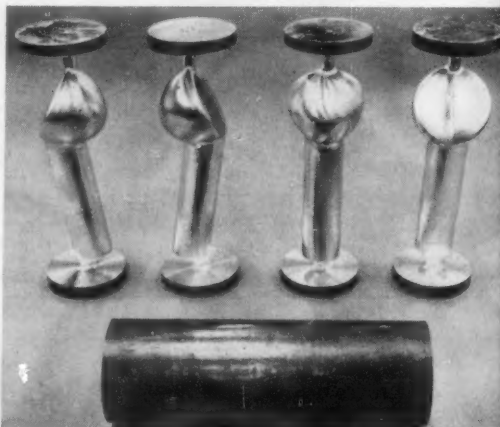
In operation, this is how the duplicating lathe works. As the off spindle pattern revolves in exact 1:1 ratio with the blank part in the lathe spindle, the stylus in the fluid tracer follows the circumferential periphery of the pattern regardless of its shape. Movement of the stylus is transmitted through the fluid tracer to a double-acting hydraulic cylinder in the cross slide on which the motor-driven cutter is mounted. This cylinder moves the cutter in exact duplication with the movements of the stylus. The slow lathe spindle speed, coupled with the high cutter capacity for metal removal, permits removal of all the metal that is necessary in order to accurately duplicate the pattern in a single pass.

A very light stylus pressure is used to permit it to follow an irregular contour with a minimum of resistance. Some of the styli have large, rounded ends. These are used when duplicating a pattern with abrupt changes in cross-sectional area, or where a protuberance is nearly vertical to the axis of the pattern. In such cases, the stylus may contact the pattern well up on the shoulder of its rounded end. But as the stylus and cutter are of the same shape, the same shoulder portion of the cutter will be doing the work at that precise instant. At all times, the cen-

ter line of the stylus and the center line of the cutter remain in the same relative positions.

The high-speed steel cutters being used have an average tool life of 120 hours. Three sharpenings are permitted before the cutter is discarded, but each sharpening is carefully controlled so that the cutter maintains the same shape as the stylus with which it is used.

**This automatic duplicating lathe can be reconverted** in a moment for use as a profile lathe, or an ordinary turning lathe, by means of a disconnect lever and by shifting the vari-speed transmission. While only aluminum parts are being duplicated at this time, Douglas engineers in charge of the project point out that substitution of a milling



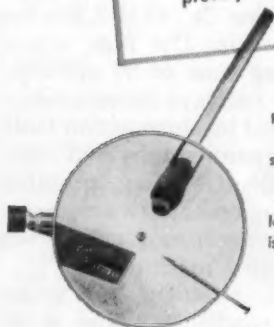
**Airplane control stick part reproduced from solid bar stock for prototype models, thus saving the 12-30 week wait for cast parts.**



# PRECISION GEARS

**YOU** who use small gears, (to 6" O.D. of the gear blank) can improve the performance of your product, through increased gear precision, without sacrifice of gear production.

**YOU** who use small, fine pitch, precision gears can increase your gear production without sacrifice of gear accuracy, or improve your gear accuracy without sacrifice of gear production.



The Hamilton Precision Gear Hobber, the hobber with a "reserve of accuracy," regularly holds work spindle and hob spindle runout to less than .0002", workspindle and tailstock spindle alignment to less than .0002", and this workmanship is maintained throughout the machine.



## WANT FACTS?

Write for Bulletin No. 5419.  
Address The Hamilton Tool Company  
828 South Ninth Street,

Hamilton, Ohio.



IT'S A

# Hamilton Tool

USE IT WITH CONFIDENCE

For more data circle 301 on Reader Service Card

August, 1956

modern machine shop 137

**"When duplicating smaller parts, it would be possible to mount several cutters on several cross arms . . ."**

head for the rotary cutter would permit the duplication of ferrous metal parts. When duplicating smaller parts, it would also be possible to mount several cutters on several cross arms, all controlled by the single fluid tracer, stylus and pattern. Plans are already afoot for a number of such duplicating lathes, each working on a high production basis, to turn out enough production parts to replace the thousands of small, odd-shaped castings and forgings that are now being used in aircraft production.

The "far dreamers" on the project have plans that extend even farther into the future. In their dreams, they see a pre-recorded tape imparting electronic signals to servo motors which replace the double-acting hy-

draulic cylinder in the cross arm, thus doing away with the necessity of a mounted pattern.

Just dreams, of course, but of such dreams, automated industry of the future will be made.

★ ★ ★

### **Pantograph and Duplicator Film**

"Tracer Control in Action" is the title of a 16 mm. full-color film with explanatory narrative on the sound track which is now available on a free loan basis from George Gorton Machine Co., 1321-Z Racine St., Racine, Wis. The film, which has a running time of 36 minutes, dramatically portrays the versatility and freedom of machine action built into Gorton pantographs and duplicators. Difficult milling, profiling and engraving operations are shown being easily performed on Gorton tracer-controlled machines.

This film, photographed under actual shop conditions, shows significant applications of Gorton equipment from producing the smallest engraving in the world, to demonstrate precision and sensitivity, to machining workpieces of almost any shape or size to demonstrate versatility. Manual operation and complete automation within the cutting cycle are combined to open new lines of thought for the tool engineer, the methods man and the production superintendent in the shop.



*Illustration showing a variety of typical three-dimensional parts reproduced on the modified Sidney profile turning lathe.*

# PORTELVATOR®

The Handy HAMILTON Portable, Elevating Table

A  
PORTABLE  
HEIGHT-  
ADJUSTABLE  
TABLE  
•  
TRUCK  
•  
WORK BENCH

for  
DIE TRANSFER  
•  
MACHINE FEEDING  
•  
ASSEMBLY AT  
BEST HEIGHT  
IN BEST LIGHT

LIFTING  
•  
LOWERING  
•  
TRANSPORT  
of  
SHEETS  
PLATES  
BARS  
TUBES  
PIPES  
TOOLS  
DIES  
FIXTURES

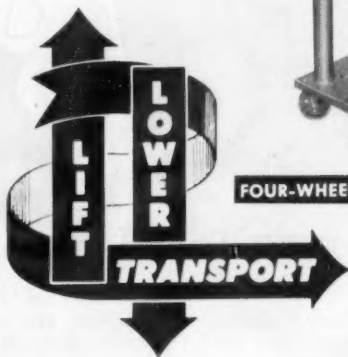
•  
ALL  
COMPACT HEAVY  
LOADS

**UNOBSTRUCTED  
PERIMETER**

**WORK FROM  
ANY SIDE**

**MORE SERVICE for LESS MONEY  
than  
ANY Other Unit of Equipment**

**43** table surfaces  
point support



**FOUR-WHEEL and**



**SIX-WHEEL MODELS**

Recent changes and additions to the line provide greater capacities, new flexibility, many bonus features.

**Write for NEW, FREE Bulletin P-5604**

Address THE HAMILTON TOOL COMPANY,  
828 South Ninth Street, Hamilton, Ohio



**IT'S A**

**Hamilton Tool**

USE IT WITH CONFIDENCE

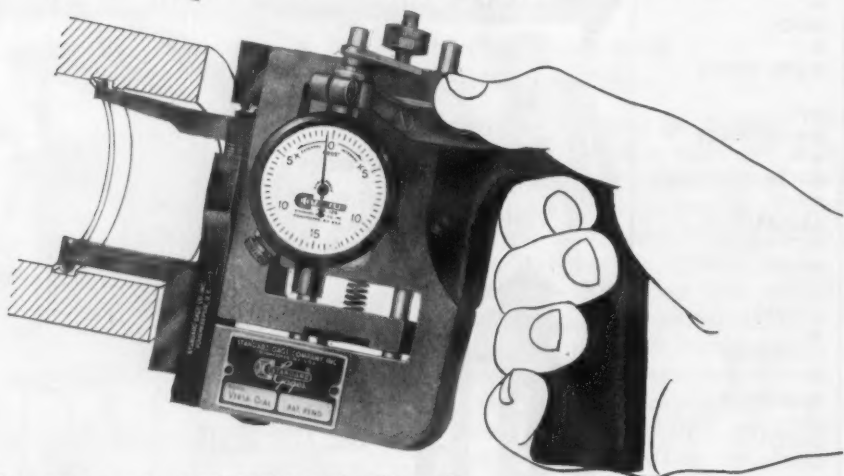
5604

For more data circle 302 on Reader Service Card



**Easy to Operate  
Easy to Read**

# **Versa-Dial®**



## The **ONE** truly **ALL-PURPOSE** Dial Gage

This Versa-Dial is fitted with fingers to measure I.D. of grooves. Other fingers are stocked for various lengths of reach and for small I.D.'s. Contact tips can be finished for O-rings, snap rings or specials, as required.

Equipped with other kinds of fingers, Versa-Dial can check your internal or external **THREADS** for assembly quality, shallow **COUNTERBORES** for I.D., **GEARS** for pitch diameter, **DOVETAILS** and a host of **SPECIAL SHAPES**.

*Write for details and prices to meet your specific needs*

**STANDARD GAGE COMPANY, INC.**  
**MEASURING INSTRUMENTS FOR PRECISION INDUSTRY**  
**124 PARKER AVE. POUGHKEEPSIE, N. Y.**



For more data circle 303 on Reader Service Card

**Twice the  
performance  
at half  
the cost...**

it's a  
**Jacobs**  
CHUCK

Jacobs and your industrial supply distributor are ready to deliver the chucks you need and the service you deserve. First in chucks... first in service.

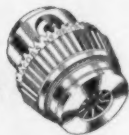
THE JACOBS MANUFACTURING COMPANY • WEST HARTFORD, CONN.



The Jacobs Plain Bearing Chuck for drill presses, portable electric and air tools.



The Jacobs Rubber-Flex® Tap Chuck for tapping heads and impact tools.



The Jacobs Model 96 Collet Chuck for grinding machines, millers and jig-borers.



The Jacobs Ball Bearing Super Chuck for heavy duty and precision industrial use.



The Jacobs Model 91 Spindle Nose Collet Chuck for tool room and engine lathes.



The Jacobs Impact Keyless Chuck especially designed for the aircraft industry.

# Machining Stainless Steel

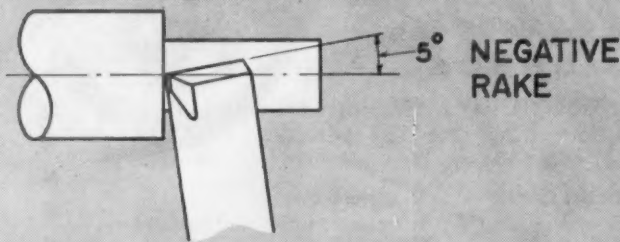
**A case history pointing out how chip elimination difficulties were overcome in box-tooling 9/16-inch stainless hexagons.**

**By G. J. STEVENS**

Machining Engineer, Armco Steel Corporation

**A shop doing subcontract work** for a large automobile manufacturer was having trouble with poor chip elimination when box-tooling Type 321 stainless 9/16-inch hexagons. A chip curler tool was being used for this operation; however, the metal chip would not roll out of the box.

The difficulty was corrected by grinding a 5-degree negative rake on top of the box cutter and making a chip curler grind, as shown in the accompanying drawing. The negative rake raised the back of the chip curler groove, which caused the cut material to curl more effectively.



Chip elimination problems in box-tooling Type 321 stainless steel 9/16-inch hexagons were readily eliminated by a subcontracting shop

by grinding a 5-degree negative rake on top of the box cutter and making a chip curler grind, as shown in this sketch.

**stop**

**make it with**



**ground flat  
tool steel**



**SOLD ONLY THROUGH CAPEWELL DISTRIBUTORS**

*who provide complete inventory . . . engineering assistance*

*. . . delivery when you need it.*

**THE CAPEWELL MANUFACTURING COMPANY**  
Hartford 2, Connecticut

Please send complete details on Microloy® Ground Flat Tool Steel to:

NAME \_\_\_\_\_

COMPANY \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_

ZONE \_\_\_\_\_

STATE \_\_\_\_\_

1C456

# 70 minutes cut

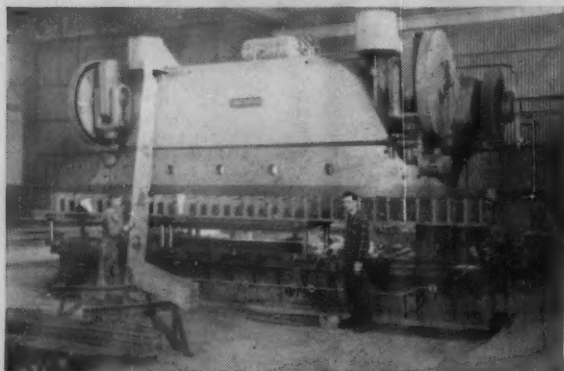
## on combined blanking and punching operations!

— FORT WAYNE STRUCTURAL STEEL CO., Inc.

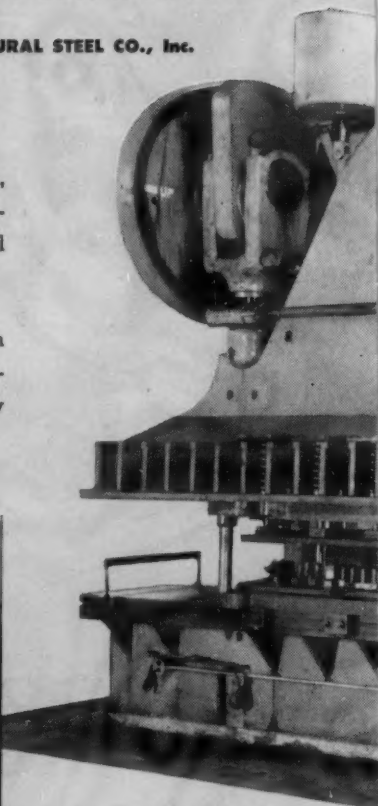
Fort Wayne, Ind.

This versatile Cincinnati All-Steel Press Brake, 34 Series x 16', has revolutionized the production of these long motor truck side rail reinforcements.

Check with our die engineering department on the application of a versatile Cincinnati All-Steel Press Brake in your shop. It can sharply reduce your production costs.



(A) Blanking floor to floor time  $1\frac{1}{4}$  minutes.  
Previous time 34 minutes.



(B) Note Fort Wayne's ingenious punching equipment which reduced punching time from 36 minutes to  $1\frac{1}{4}$  minutes and took advantage of every versatile Cincinnati feature.



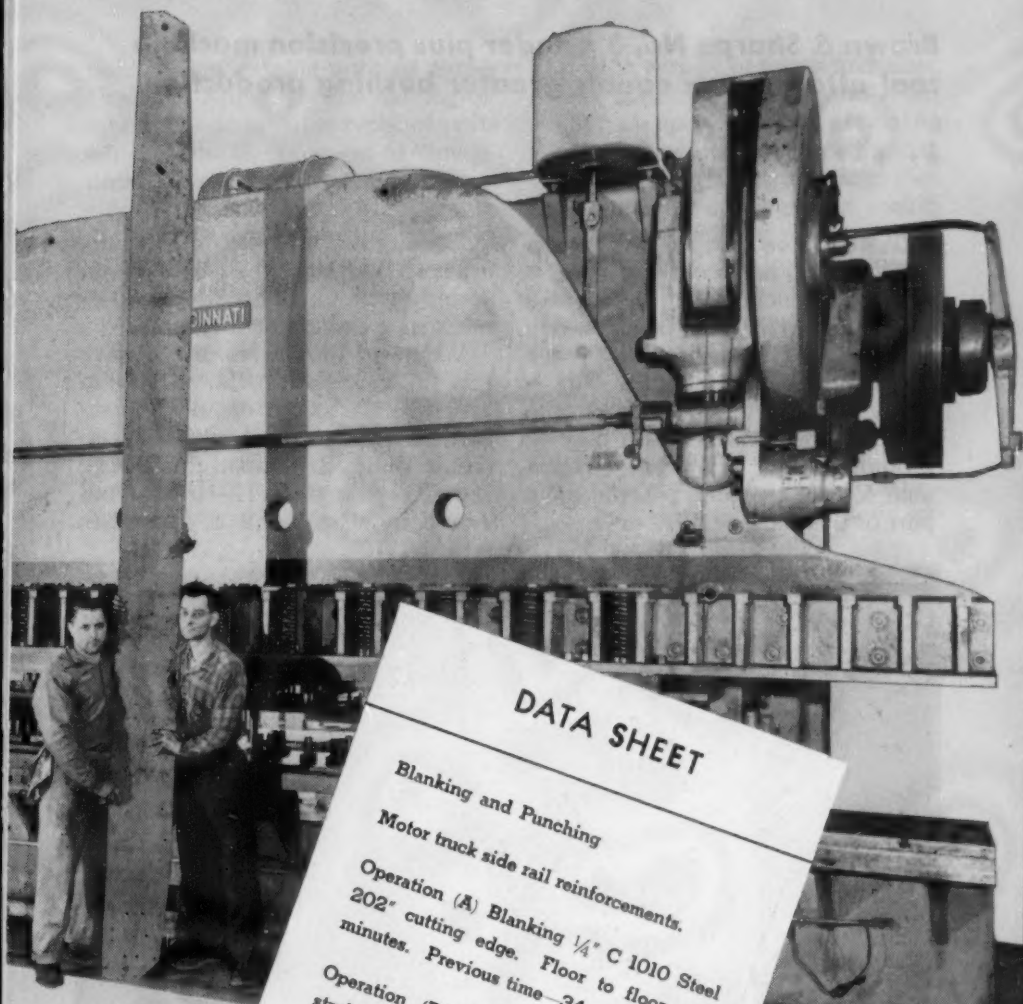
### THE CINCINNATI SHAPER CO.

CINCINNATI 25, OHIO, U.S.A.

SHAPERS • SHEARS • BRAKES



# to 2.6 minutes...



## DATA SHEET

Blanking and Punching  
Motor truck side rail reinforcements.

Operation (A) Blanking  $\frac{1}{4}$ " C 1010 Steel  
202" cutting edge. Floor to floor—1 $\frac{1}{4}$   
minutes. Previous time—34 minutes.

Operation (B) Punching 130 holes per  
stroke. Floor to floor—1 $\frac{1}{2}$  minutes. Previ-  
ous time—36 minutes.

*John L. Hayner*  
President

Photos Courtesy—  
**FORT WAYNE**  
**STRUCTURAL STEEL CO., Inc.**  
Fort Wayne, Indiana



# Converting a Grinder to

***Brown & Sharpe No. 3 grinder plus precision machine tool attachments equals greater bushing production.***

By BARTLETT WEST

**Quite often out in the shop** someone who has been working at a particular machine for a time will come up with an idea for improving production. The idea may involve a new method of handling the work, a change in the design of the equipment, or the like. The idea may be prompted from viewing a comparable setup operating in some other part of the plant or shop, or through

discussing the job with some interested fellow employees, or through seeing a write-up of accessory equipment in a catalog or magazine.

Whatever the source of the idea, one thing is certain, the ability to visualize the extent of an improvement is greatly enhanced if one can see examples. It is upon this theory that The Standard Electrical Tool Company, Cincinnati 4, Ohio, has



**BEFORE**—View of a Brown & Sharpe No. 3 single purpose grinding machine prior to being retooled with the aid of Standard precision machine tool attachments.

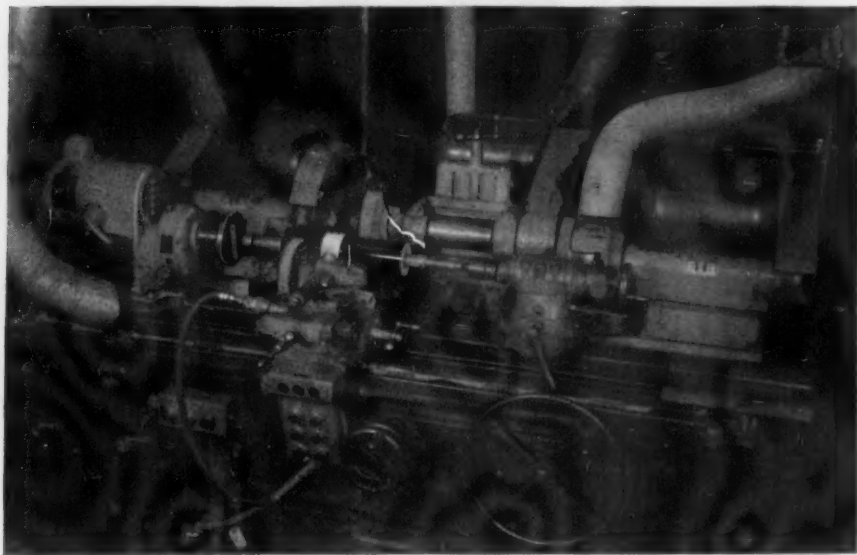
# Increase Production

published a catalog entitled *Super Precision Spindles*. The catalog offers the basic popular types of units which allow the prospect to "imagine" his own requirement and specify the modifications he prefers. In the catalog, for example, is a detailed description of the setup illustrated herewith.

Fig. 1 shows a view of a "before" setup for fabricating porcelain bushings. It had been possible for the manufacturer to perform but one operation — that of grinding one groove by means of the single purpose Brown & Sharpe No. 3 grinder shown. Since the bushing is required

in a wide variety of forms and sizes, it was therefore necessary to interchange complex dressed grinding wheels in order to perform the o.d. grinding and groove grinding. Further, a cutting-off operation required the use of another machine especially designed for that purpose.

Viewing the requirements for manufacturing the bushings in the light of the existing single purpose grinder and the precision equipment available from Standard a decision was made to attempt to develop a procedure which could be pre-established on a job schedule and the entire function of four op-

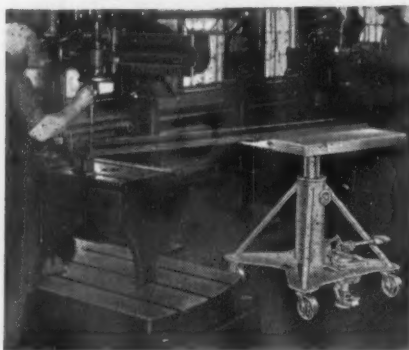


**AFTER**—View of same Brown & Sharpe No. 3 single purpose grinder shown on the opposite page following retooling with Standard precision machine tool attachments.



PORTABLE

## ELEVATING TABLE



### 1. POSITIONS WORK

at proper height for machining or attaching

### 2. SUPPORTS LONG PIECES

during drilling and machining operations.

### 3. HANDLES DIES

simplifies die transfer, installation, removal.

Does all these—and more! Hydraulically operated, highly portable. 2,000 lb. capacity. Standard Model elevates 28" to 44"; Telescopic, 28" to 50".

*Write for Bulletin 233.*

#### **The RAYMOND CORPORATION**

8875 Madison St., Greene, N.Y.

For more data circle 308 on Reader Service Card

148 modern machine shop

### Converting a Grinder . . .

erations simply accomplished by a semi-skilled operator. By referring to the catalog, three Standard precision spindles with their appropriate slides were selected for modifying the single purpose B & S.

The result of the complete modification is shown in Fig. 2. Now it is possible to quickly and easily perform four grinding operations with one set-up. These are o.d. grinding, end grinding, groove grinding and cut-off. Thus far, the improvement has resulted in labor savings ranging from 30 to 50 per cent, depending upon the style bushing being ground. This is but one example of the endless versatile variations made possible through the use of Standard dynamically balanced spindles and machine tool attachments.

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★



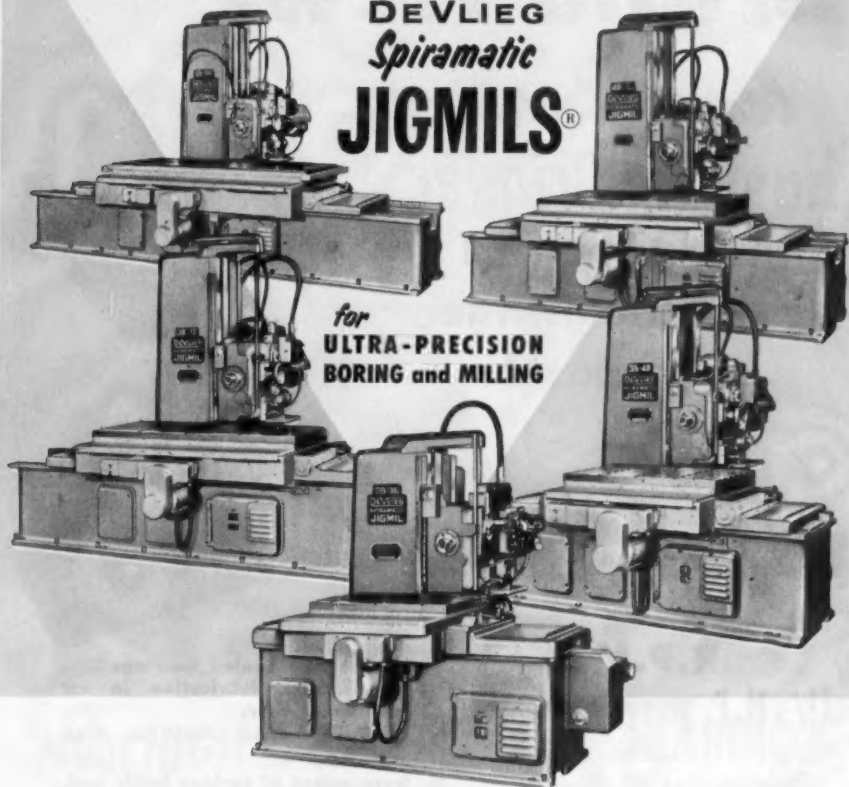
"Who swiped July and August?"

August, 1956

Every day... *Everywhere*... Your Competitors are using

DEVLIEG  
*Spiramatic*  
**JIGMILS®**

for  
**ULTRA-PRECISION  
BORING and MILLING**



**THE "ACCEPTED" MACHINE FOR JIGLESS PRODUCTION OR ONE-PIECE JOBS**

The Devlieg System of "JIGLESS BORING"—★ Eliminates expensive jigs ★ Permits complete flexibility of product design ★ Insures interchangeable assembly of parts without hand fitting.

Devlieg JIGMILS are widely used in toolrooms and experimental shops for machining all types of jigs, fixtures and experimental parts to precise limits of accuracy with a minimum of operator skill.

*Come to Detroit*

SEE A PRACTICAL  
DEMONSTRATION OF THE  
JIGMIL TECHNIQUE

**DEVLIEG MACHINE COMPANY**

Write for Illustrated Catalog

450 Fair Avenue • Ferndale  
DETROIT 20, MICHIGAN

For more data circle 309 on Reader Service Card

# Brand New!

*haskins*  
**hask AIR Grinder...**  
**most powerful**  
**air turbine grinder**  
**in its class!**

**75,000**  
**R.P.M.**  
**(1/5 H.P. prony brake test)**



- Permanently sealed bearings . . . never needs lubrication in air lines or grinder.
- Removable nose piece for deep grinding.
- Gyro action of turbine holds tool steady.

Here's power—SUSTAINED POWER—like you've never experienced before in an air grinder . . . power unexceeded by any other air grinder in the same price range . . . maintains its high-speed efficiency under load! Built with a lightweight, contoured, hand-fitting aluminum housing, the Haskins *hask AIR* Grinder handles easily, balances perfectly . . . excellent for the most precise grinding job. Complete kit includes: carrying case, adapter hose, mounted points, dressing stone and wrenches.

**for Complete details**



**WRITE**  
***haskins***

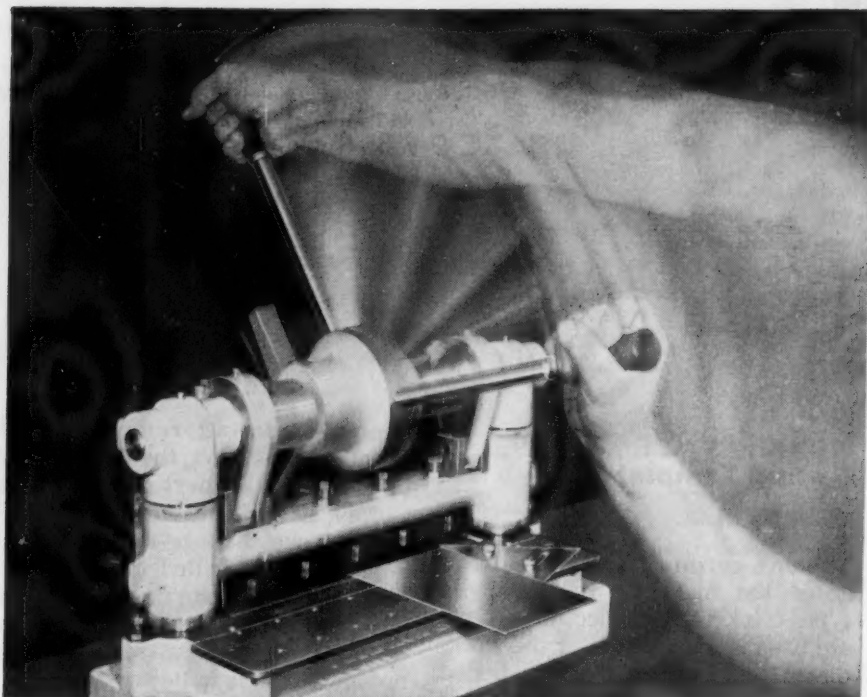
HASK - AIR

HASK - FLEX



2647 W. HARRISON ST.  
CHICAGO 12, ILL.

For more data circle 310 on Reader Service Card



METALS



SCREEN MESH



MICA



RUBBER



FIBRE



LEATHER



PLASTIC

## Want HIGH SPEED PRECISION SHEARING?

Check These Features and You'll want a Versatile DI-ACRO\* SHEAR

- **PRECISION**—strips less than .025" wide accurately sheared and duplicated.
- **CUTTING SPEED**—rivals power machines.
- **RATED CAPACITY**—16 gauge steel.
- **EASY TO OPERATE**—a woman can operate it with minimum effort.
- **CHOICE OF MODELS**—available in four sizes. Widths from 6 to 24 inches. Four power models.
- **ENGINEERING SERVICE**—always available.
- **PORTABLE**—readily moved about.
- **RUGGED**—backed by year warranty.
- **DELIVERY**—immediate on most models.
- **COST**—that's good too.



### WANT MORE INFORMATION? \*pronounced Die-ack-ro

New catalog gives complete details on all hand and power operated Di-Acro machines. Consult the yellow pages of your phone book for the name of your nearest Di-Acro distributor or write:



Creators of "DIE-LESS DUPLICATING"  
O'NEIL-IRWIN MFG. COMPANY, 306 8th Ave., Lake City, Minn.

For more data circle 311 on Reader Service Card

August, 1956

modern machine shop 151



## ideas from readers

**Several time-saving suggestions for the man in the shop.**

### Indexable Type Flame Cutting Templet

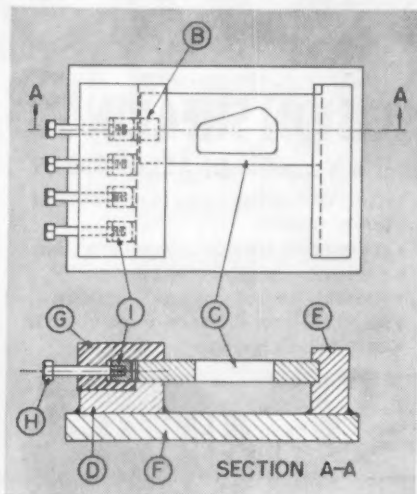
By WALTER STRIKE

**Flame cutting templets**, whether of the magnetic type, spindle type, track type or electronic type, are usually removed after the workpiece is cut and then repositioned and clamped. To eliminate this

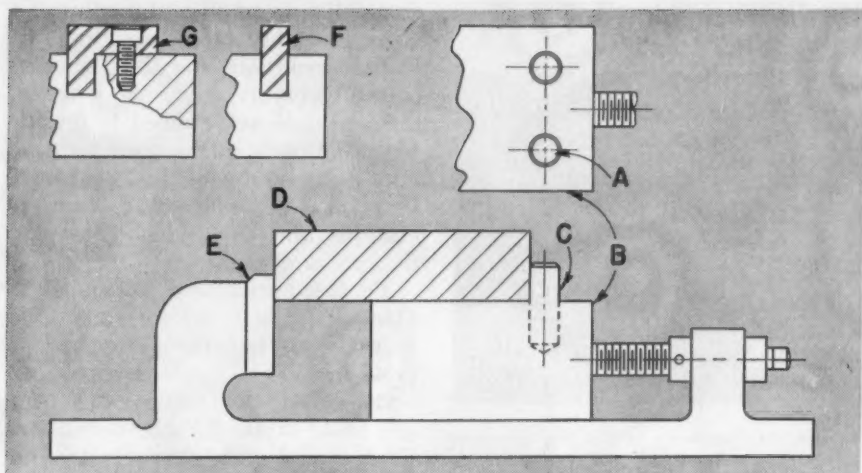
time-consuming removing and clamping operation, the templet can be indexed to its next position quite simply, as indicated in the accompanying sketch.

A slot, *B*, is milled into the templet *C* which is then mounted in the sliding index fixture shown. Two uprights, *D* and *E*, are welded to the base *F*. A slot is milled on the inside vertical surface of the upright *E* while the upright *D* is machined to a step as shown. The coverplate *G* is milled to fit against the step of the upright *D*. Several holes are drilled into the coverplate *G*, the spacing of which must equal the distance the templet is to be moved to the next position. These drilled holes are slightly larger than the bolts *H* and are counterbored to a slip fit with the plungers *I*, which are short lengths of drillrod that have been drilled and tapped to accommodate the bolts *H*.

The templet is shown in position for the first plunger to enter the slot of the templet. After cutting the first workpiece, the plunger is retracted, and finger pressure is applied against the next plunger. The tem-



Sketch of indexable flame cutting templet.



Sketch showing simple method for increasing workholding capacity of milling machine vise.

plet is then moved within the track until the second plunger enters the slot of the templet.

Additional index positions can be added to a fixture of this design at very little extra cost.

★ ★ ★

## Increasing the Capacity of a Milling Machine Vise

By H. J. GERBER

**For increasing the capacity** of a milling machine vise to allow for the holding of large flat pieces of work, the author, in the accompanying sketch, shows a simple method of accomplishing this task. The method involves merely the drilling and reaming of two holes, A, near the end of the sliding jaw block, B. Two large diameter dowel pins or pieces of drill rod, C, are then inserted into these holes. The harden-

ed jaw plate on the slide block is then removed so that the workpiece, D, can be placed on top of the block and gripped between the permanent jaw plate, E, and the two pins, A.

Where a greater holding force is required, it may be desirable to mill a slot crosswise in the block, B, and insert a heavy parallel bar, F, in place of the two dowel pins. Where maximum rigidity is required, the bar can be made L-shaped, as shown at G, and fastened to the sliding jaw block with screws.

★ ★ ★

## Blueprints Simplify Arrangement of Stock for Assembly Work

By JOHN ROGERS

**To perform assembly work efficiently**, component parts should be placed in proper sequence, proper

## ideas from readers . . .

DRAWING NO. X-387-1 5 UNITS CASE ASSEMBLY NO. X-387					
15 BEARINGS NO. X-1287		10 GEARS NO. G-181		BOX 25 BOLTS NO. B-32	
5 OILSEALS NO. X-392				BOX 25 WASHERS NO. W-511	
				BOX 15 NUTS NO. N-335	
10 RODS NO. X-188	5 GEARS NO. G-1252	5 COVERS NO. C-12	5 RODS NO. R-42	BOX 10 GASKETS NO. L-562	

Example of assembly table top blueprint which can be made up to simplify the arrangement of stock for assembly work.

location and always in the same position on the assembly tables. In many plants handling fairly large

assemblies in small and medium lot sizes, assembly tables are prepared in the stockroom and then wheeled to the assembly floor. After assemblers become accustomed to finding the same parts in the same location and in proper assembly sequence, they become proficient in their operations and consequently a great deal more efficient.

To help stockroom personnel in placing the material correctly, it is quite helpful to make a sketch of the table top after standards personnel and shop supervision have approved the table layout. Then, a full size blueprint of each assembly table is made, as shown in the accompanying illustration. Before stockroom personnel starts picking materials for an assembly table, a copy of the blueprint is placed on the table and

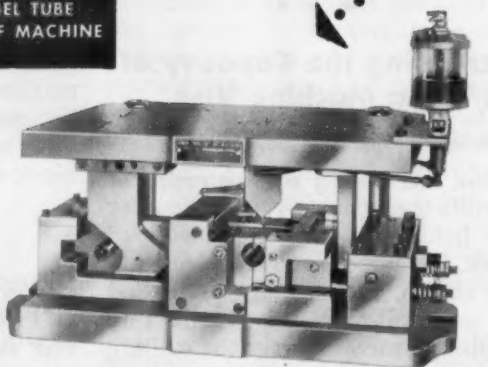
## • Cuts Tubing to Accurate Lengths in - SPLIT-SECOND TIME!

LENGTHS of  $\frac{1}{2}$  inch or more are accurately cut to  $\pm .010$ " with each stroke of press—actually less than  $\frac{1}{2}$  of a second or faster than any other known method. In addition to being rapid and precise, the Vogel Cut-Off also cuts clean with a minimum of burr and distortion. Many thousands of cuts can be made before shear blades require sharpening.

Unit No. 12 accommodates tubing up to  $\frac{1}{2}$ " O.D. with  $\frac{3}{32}$ " wall; the No. 2 takes tubing up to 2" O.D. with  $\frac{1}{8}$ " wall.

Ask for sample showing how clean-cut your tubing can be sheared with this machine.

### VOGEL TUBE CUT-OFF MACHINE



PATENTED

# VOGEL

TOOL AND DIE CORPORATION  
1823 NORTH 32nd AVENUE, MELROSE PARK, ILLINOIS

For more data circle 312 on Reader Service Card



**"You're Looking  
For Trouble"**

**if you buy on price alone**

**BULLARD**

"Like many other firms," says Mr. A. Balas, Equipment Engineer at Mergenthaler Linotype Co., N.Y.C., "we are constantly on the alert for new equipment, new processes and new ideas. This constant search for improvement convinced us of the need to purchase a versatile, time-saving, cost-saving and, above all, accurate Horizontal Boring Machine. We checked them all — feature for feature — and then bought the Bullard H.B.M., Model 75. We feel it has enough "built in reserves" to take care of any contingency or new development which may come up. It's reassuring to know that an investment of this size won't go out of style next month."

Why don't you get the full story on the many features and advantages offered you with a Bullard H.B.M., Model 75 in your plant. For a complete line catalog, just call your nearest Bullard Sales Office, Distributor or write

**THE BULLARD COMPANY BRIDGEPORT 9, CONN.**

For more data circle 313 on Reader Service Card

## ideas from readers . . .

the parts are then placed on top of the blueprint.

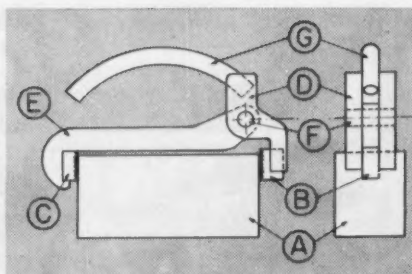
This system not only aids stockroom personnel in placing the material, but it also eliminates the handling and checking of lists or bills of material. Furthermore, shortages show up easily and the time required for filling these is reduced.

★ ★ ★

## Safety Tongs for Handling Sharp-Edged Blocks

By ROGER JOHNSON

A large number of steel blocks, approximately 4 x 4 x 10 inches in size and weighing over 45 lb., had to



Sketch of safety tongs intended for use in handling blocks having sharp edges.

be lifted in and out of fixtures. The blocks had sharp edges and were awkward to handle. For greater safety and less fatigue in handling these blocks, the tongs shown in the accompanying sketch were designed and built.

The block A is engaged by the serrated and flame-hardened jaws B and C. The jaw B is sandwiched between the two plates D and welded to these plates, while the jaw C is welded to the arm E. The hinge pin F provides leverage for the pipe handle G which is securely welded between the two plates D.

Save  
80%

Machine  
Moving  
Time



- Load capacity to 100,000 lbs.
- Top plate swivels, 360° directional control
- Nothing to wear out—nothing to maintain
- Two 4-inch roller bearing cast iron dollies

**MIGHTY MOVER CO.**

1478 S. Milwaukee St. • Denver 10, Colorado

For more data circle 314 on Reader Service Card

156 modern machine shop

## GRIND THE Eastern Centerless Way

Our new plant with  
increased facilities  
assures

**PROMPT SERVICE**

**Eastern Centerless Grinding Co**  
470 Tolland Street East Hartford 8, Conn.

For more data circle 315 on Reader Service Card

August, 1956



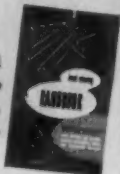
# Here's the final touch for a close tolerance job...

## INDIA & HARD ARKANSAS OILSTONE FILES

These outstanding precision tools assure highly accurate results no matter how intricate the surface, or how tough the material. Try them on your tools, dies and parts. INDIA for regular work, HARD ARKANSAS for superfine finishes.

### WRITE FOR THIS NEW HAND STONING HANDBOOK

It contains illustrations and descriptions of the complete Behr-Manning Oilstone Line. Address Behr-Manning Co., Troy, N. Y., Dept. MS-8.



You can choose from a selection of 35 shapes and 97 sizes.



For more data circle 316 on Reader Service Card



EASY TO INSTALL

SIMPLE TO OPERATE



## highly sensitive electronic control unit

*controls quality  
during actual  
processing*

CONTINUOUS GAGING  
OR  
MOMENTARY GAGING

CONTINUOUS  
OPERATION

SHOCK MOUNTED  
CASE

STANDARD  
INDUSTRIAL  
ELECTRON TUBES

### SENSING ELEMENTS ARE BUILT INTO THE GAGE HEADS

To provide automatic measuring such as gaging and sorting, weighing, pressure control, fatigue testing, inspection, and thickness control.

### AMAZING SENSITIVITY IS BUILT INTO THESE UNITS

Using standard Industrial Electronic Gage Heads this system of measurement provides four linear full scale displacement ranges from plus or minus .0001 inch to plus or minus .100 inch. Each range is divided into 20 scale divisions on the meter. Dimensional variations of five millionths of an inch are detectable when required.

### CONTROL IS PROVIDED BY MEANS OF 2 POWER RELAYS

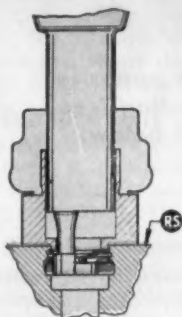
They can be adjusted to operate at any desired control point on the meter, and on any one of the 4 sensitivity ranges; on plus or minus tolerances; on 2 successive plus tolerances; or on 2 successive minus tolerances. All initial adjustments are made inside the unit. These units require no other attention during operation—and the panels can be locked to prevent tampering.

# INDUSTRIAL electronics, inc.

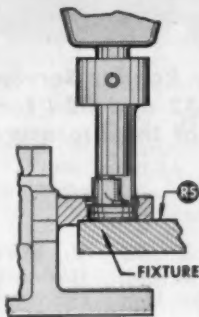
8060 WHEELER STREET • DETROIT 10, MICHIGAN

For more data circle 317 on Reader Service Card

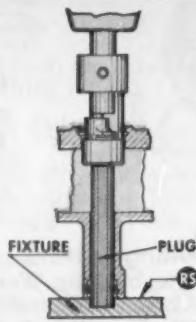
## Even Unskilled Labor Can Use This Versatile Tool Accurately! It Simplifies Internal Grooving Problems, Cuts Production Costs!



A) Cuts two grooves of different depths and widths in one single operation from same reference surface.



B) Cuts groove in bore located in protruding member of workpiece. Reference surface on under side of protrusion.



C) Cuts grooves in two bores of different diameters from same reference surface. Tool banks on reference surface. Then workpiece is reversed and tool banks on plug.

**Amazingly versatile!** Your toughest recess cutting problems can be met simply and efficiently with the Waldes Truarc Grooving Tool because it offers a whole range of possibilities beyond the range of ordinary recessing tools.

**Wide Cutting Range!** The Waldes Truarc Grooving Tool comes in 5 models...enabling you to cut accurate grooves in housings with diameters from .250 to 5.00 inches.

**Send Your Problems to Waldes!** Send us your blueprints...let Waldes Truarc Engineers give you a complete analysis, price quotation and delivery information on the most economical tool set-up for your particular job. There is no obligation!

Write NOW for a 20-page manual containing full information on Waldes Truarc Grooving Tool



**WALDES**  
**TRUARC**<sup>®</sup>  
**GROOVING TOOL**

Made by the Manufacturers of Waldes Truarc Retaining Rings  
WALDES KOHINOOR, INC., 47-16 Austel Place, L.I.C. 1, N.Y.  
Waldes Truarc Grooving Tool Manufactured  
Under U. S. Pat. 2,411,426

Waldes Kohinoor, Inc., 47-16 Austel Pl., L.I.C. 1, N.Y.  
Please send me your new 20-page technical manual  
on the Waldes Truarc Grooving Tool. MM 088

Name \_\_\_\_\_

Title \_\_\_\_\_

Company \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_

For more data circle 318 on Reader Service Card

August, 1956

modern machine shop 159

## new literature

*Use the Reader Service Cards opposite pages 32 and 324 for requesting free copies of the literature listed below.*

**1. Milling Cutters**

Aber Engineering Works, Waterford, Wis. Curved tooth milling cutters that cut straight with a curve.

**2. Surface Grinder**

Abrasive Machine Tool Co., East Providence, R. I. No. 618 hand feed precision surface grinder.

**3. Diamond Wheels**

Ace Abrasive Laboratories, 35 Roselle St., Mineola, N. Y. Star Dust diamond wheels and hones.

**4. Punch Press**

Alva Allen Industries, Dept. MM, Clinton, Mo. 5 ton Model B-5 power bench type punch press.

**5. Stress Values**

The Babcock & Wilcox Co., Tubular Products Division, Beaver Falls, Pa. Maximum allowable stress values for ferrous pipe and tubing.

**6. Positioning Table**

Barnes Engineering Co., Binotrol Division, Stamford, Conn. Binotrol automatic positioning table.

**7. Self-Leveling Isolators**

Barry Controls, Inc., 883 Pleasant St., Watertown 72, Mass. Barrymount self-leveling isolators.

**8. Abrasive Products**

Bay State Abrasive Products Co., Westboro, Mass. Abrasive wheels, points, sticks, stones, cloth and hones.

**9. Sprockets**

Boston Gear Works, 68 Hayward St., Quincy, Mass. Bored-to-size sprockets complete with keyway and setscrew.

**10. Vertical Turret Lathe**

The Bullard Co., 286 Canfield Ave., Bridgeport 9, Conn. Man-au-trol Model 75 vertical turret lathe.

**11. Hole Saws**

The Capewell Manufacturing Co., Hartford 2, Conn. High speed Safetech hole saws.

**12. Engine and Toolroom Lathe**

Carroll-Jamieson Machine Tool Co., Batavia, Ohio. 16 inch variable speed engine and toolroom lathe, Model VS.

**13. Hardware**

Chicago-Latrobe, 419 W. Ontario St., Chicago 10, Ill. Line of hardware; including drills, drill sets, drill assortments, reamers and countersinks.

**14. Rivets**

Chicago Rivet & Machine Co., 950 S. 25th Ave., Bellwood, Ill. Standard precision made semi-tubular, full tubular and split rivets and bag studs.

**15. Milling Machines**

The Cincinnati Milling Machine Co., Cincinnati 9, Ohio. Powermatic milling machines.

**16. Precision Internal Gage**

Comtor Co., 64 Farwell St., Waltham 54, Mass. Comtorplug with interchangeable expanding plugs.

### **17. Optical Comparator**

Covel Manufacturing Co., Benton Harbor, Mich. No. 14 optical comparator permits quick economical precision inspection in the shop.

### **18. Hydraulic Presses**

Dake Corp., 612 Seventh St., Grand Haven, Mich. Movable frame hydraulic presses that are designed for hand, electric or pneumatic operation.

### **19. Die Cushions**

Danly Machine Specialties, Inc., 2100 S. Laramie Ave., Chicago 50, Ill. Pneumatic die cushions and hydropneumatic die cushions.

### **20. Metal Stampings**

Dayton Rogers Manufacturing Co., Minneapolis 7D, Minn. Metal stampings in small lots.

### **21. Guide Pin Bushings**

Detroit Die Set Corp., 2895 W. Grand Blvd., Detroit 2, Mich. Guide pin bushings for die sets; also information on standard bushing design, special bushings and lubrication.

### **22. Toolholders**

DeVlieg Microbore Co., 2720 W. Fourteen Mile Rd., Royal Oak, Mich. Flash-Change toolholders and precision tooling.

### **23. Diamond Products**

Diamond Tool Research Co., Inc., 380 Second Ave., New York 10, N. Y. Diamond dressing and trueing tools, cutting and boring tools, powder, compound and plated mandrels.

### **23. Rotary Cutting Tools**

Elgin National Watch Co., Abrasive Division, Dept. P, Elgin, Ill. Golden-Circle rotary tools.

### **25. Belt Grinder**

The Engelberg Huller Co., Inc., 107 Seneca St., Syracuse, N. Y. Multiple-head, conveyor type abrasive belt grinder.

### **26. Press Brakes**

Excelsior Tool & Machine Co., 31st and Ridge Ave., E. St. Louis, Ill. All steel press brakes—15 through 200 ton capacities.

### **27. Air Gage**

Federal Products Corp., 6144 Eddy St., Providence 1, R. I. Dimensionair high precision air gage.

### **28. High Production Carbide**

Firth Sterling, Inc., 3113 Forbes St., Pittsburgh 30, Pa. Firthite TXL—a specially designed carbide grade for machining steel from the finishing cuts to medium roughing range.

### **29. Hydraulic Cylinders**

Galland-Henning, Nopak Division, 2758A South 31st St., Milwaukee 46, Wis. Class 4 high pressure hydraulic cylinders for 2,000 p.s.i. service.

### **30. Screw Machines**

Gear Grinding Machine Co., 3901 Christopher, Detroit 11, Mich. Detroit Screwmatic 750 single spindle bar automatic screw machines.

### **31. Bevel Gear Machinery**

Gleason Works, 1000 University Ave., Rochester 3, N. Y. Bevel and hypoid gear equipment, testing and lapping equipment and heat treating and coupling equipment.

### **32. Small Tools**

George Gorton Machine Co., 1705 Racine St., Racine, Wis. Small tools and accessories, including master copy type.

### **33. Visual Control**

Graphic Systems, 55 W. 42nd St., New York 36, N. Y. Boardmaster visual control gives graphic picture of your operations.

### **34. Bar Machines**

Greenlee Brothers & Co., 1887 Mason Ave., Rockford, Ill. Six spindle model bar automatics.

### **35. Elevating Table**

The Hamilton Tool Co., 828 S. Ninth St., Hamilton, Ohio. Portelator — a handy portable elevating table.

### **36. Control Valves**

Hanna Engineering Works, 1758 Elston Ave., Chicago 22, Ill. Flo-Line control valves for 4-way air operation up to 250 p.s.i.

**37. Files**

Heller Tool Co., Newcomerstown, Ohio. Vixen milled curved-tooth files.

**38. Progressive Dies**

B. Jahn Manufacturing Co., Cherry St., New Britain, Conn. Progressive dies, tools, jigs, fixtures, gages and special machinery.

**39. Wax Cutting Fluids**

S. C. Johnson & Son, Inc., Racine, Wis. "Cutting and Grinding with Johnson's Wax Cutting Fluids."

**40. Dividing Collet Head**

Kuma Tool Co., 4712 S. Kenwood Ave., Chicago 15, Ill. Precision universal dividing collet head.

**41. Extrusion Presses**

Lake Erie Engineering Corp., Box 68, Kenmore Station, Buffalo 17, N. Y. Presses for the extrusion of ferrous and non-ferrous metals.

**42. Arc Welder**

The Lincoln Electric Co., Cleveland 17, Ohio. Idealarc features instant selection of a.c. or d.c.

**43. Ladling Unit**

Lindberg Engineering Co., Lindberg-Fisher Division, 2469 W. Hubbard St., Chicago 12, Ill. Lindberg-Fisher automatic ladling unit for aluminum.

**44. Squaring Shears**

The Lodge & Shipley Co., 3058 Cole-rain Ave., Cincinnati 25, Ohio. Squaring shears that are all clear in the back and have all adjustments in the front.

**45. End Mills**

Melin Tool Co., Inc., 3373 W. 140th St., Cleveland 11, Ohio. End mills manufactured in 2, 3 and 4 flute types.

**46. Drill Jig Bushings**

W. F. Meyers Co., Inc., Bedford, Ind. Meyco carbide inserted type drill jig bushings.

**47. Tool Block and Holders**

The Monarch Machine Tool Co., Sidney, Ohio. Pre-ground, pre-calibrated Quik-Tool ready-set tooling provides immediate tool change.

**48. Ring and Circle Shear**

Niagara Machine & Tool Works, Buffalo 11, N. Y. No. 31-RC ring and circle shear which cuts circles, cuts straight and cuts irregular outlines.

**49. Metal Marking**

Noble & Westbrook Manufacturing Co., 25 Westbrook St., E. Hartford, Conn. Complete Noblewest line plus illustrations of marking applications.

**50. Oil Seal Puller**

Patton Manufacturing Co., Inc., 1802 W. Pleasant St., Springfield, Ohio. Patton oil seal puller does the job quickly and easily without damage to parts and castings.

**51. Punches**

Pivot Punch & Die Corp., North Tonawanda, N. Y. Cylindrically ground punches.

**52. Kellering Attachment**

Pratt & Whitney Co., Inc., 25 Charter Oak Blvd., West Hartford 1, Conn. Velvettrace kelling attachment for copying intricate forms in metal.

**53. Tapping Equipment**

Procurer Safety Chuck Co., Dept. 7, 12 S. Clinton St., Chicago 6, Ill. Complete line of tapping equipment.

**54. Grinding**

Ready Tool Co., 554 Iranistan Ave., Bridgeport, Conn. New concept in the art of grinding that guarantees micro-finish with positive roundness.

**55. Collets**

Rivett Lathe & Grinder, Inc., Dept. MMC7, Brighton 35, Boston, Mass. Collets in fractional round sizes and decimal equivalents from 1/64 inch to capacity.



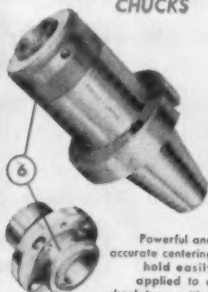
# Scully-Jones

## PREMIUM ACCURACY CHUCKING TOOLS

**pay for themselves fast**

Unique operating principle brings you extreme accuracy along with tremendous holding power for internal or external chucking of parts and tools

### NEW "BETTER-HOLD" CHUCKS



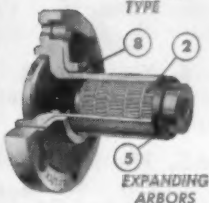
Powerful and accurate centering hold easily applied to a shank-type cutting tool by the "lock-and-eject" collet.

These benefits	... for these reasons	... result from these PREMIUM features	"ROLL-LOCK" TOOLS
INCREASED ACCURACY	Run-out is often less than .0001 in.	1. Equal force is evenly applied all around the chucking surface, eliminating all play and accurately centering the part or tool.	
		2. Rollers are selected to tolerances of $\pm .00004$ in.	
		3. Parts are made of tool steel carefully heat-treated and precision-ground to a high surface finish.	
INCREASED PRODUCTION	Reduce loading and unloading time	4. Very little turning force required to produce tremendous holding pressures. Only rolling friction to overcome.	
		5. Accurate centering hold or shrink fit easily applied by twisting the actuating cone. Powerful wedging action expands chucking surface — no arbor presses or hammering required. Hold or fit is easily disengaged.	
		6. Powerful, accurate centering fit easily applied to shank-type cutting tool by twisting the actuating ring.	
	Speed tool changes	7. Extreme rigidity and tremendous holding power permit use of heavier feeds at higher speeds.	
	Speed operations	8. Pieceparts are always easy to load in the same position due to the simple and accurate method of locating and chucking.	

### EXPANDING MANDRELS

### FLANGE-TYPE CHUCKS

### FLANGE-TYPE



**SCULLY  
JONES**

Call your Scully-Jones factory-trained representative or distributor for complete information and prices.

**PRECISION HOLDING TOOLS**  
"Precision Holding" for holding precision

Scully-Jones and Company, 1909 South Rockwell St., Chicago 8, Ill.

For more data circle 319 on Reader Service Card

August, 1956

modern machine shop 163



**56. Power Presses**

Sales Service Machine Tool Co., 2355 University Ave., St. Paul 14, Minn. Press-Rite "Juniorline" open back inclinable power presses.

**57. Test Indicators**

George Scherr Co., Inc., 200-MM Lafayette St., New York 12, N. Y. "Pup-pitast" universal test indicators for general toolroom and machine shop use.

**58. Sleeves and Sockets**

Scully-Jones and Co., 1909 S. Rockwell St., Chicago 8, Ill. Sleeves, sockets and turret toolholders.

**59. Tool Control System**

Seibert & Sons, Inc., Chenoa, Ill. Tool control system that keeps machine tools producing at full capacity.

**60. Tools and Blanks**

Somma Tool Co., Inc., 20 Brown St., Waterbury, Conn. Davenport standard tools and blanks.

**61. Fasteners**

Standard Pressed Steel Co., Box 556, Jenkintown 22, Pa. Standard Unbrako fasteners.

**62. Flexible Shafting**

Stow Manufacturing Co., 1 Shear St., Binghamton, N. Y. Complete information on all sizes of shafting, from  $\frac{1}{8}$  to  $1\frac{5}{8}$  inches in diameter, designed for either power drive or remote control applications.

**63. Live Centers**

Sturdimatic Tool Co., 3904 F St., Detroit 16, Mich. Engineered live centers.

**64. Quenching Oil**

Sun Oil Co., Philadelphia 3, Pa. Sun-quench 78—a new fast quenching oil.

**65. Honing Machine**

Superior Hone Corp., 1615 Elreno St., Elkhart, Ind. Model H. M. Honemas-ter manually operated honing machine.

**66. Vibratory Equipment**

Syntron Co., 309 Lexington Ave., Homer City, Pa. Vibrators, feeders, screens, other industrial equipment, shaft seals, selenium rectifiers, diesel pile hammers, power tools, gasoline hammer drills, electric hammers, portable electric saws, and so on.

**67. Air Gage**

The Taft-Peirce Manufacturing Co., Woonsocket, R. I. Six special ways to air gage for lower costs and higher production.

**68. Electric Furnaces**

Thermo Electric Manufacturing Co., 488 Huff St., Dubuque, Iowa. Electric furnaces, temperature controllers and hot plates.

**69. Dust Collection**

Torit Manufacturing Co., 296 Walnut St., St. Paul 2, Minn. "You Can Solve That Dusty Cost Problem."

**70. Holders and Tips**

Valenite Metals Corp., Box 205, Royal Oak, Mich. Throwaway insert holders and tips.

**71. Thread Measuring Wires**

The Van Keuren Co., 175 Waltham St., Watertown, Mass. Calibrated thread measuring wires with matched constants.

**72. Toolholders**

Vascoloy-Ramet Corp., 862 Market St., Waukegan, Ill. Complete line of toolholders and carbide inserts for cutting tools.

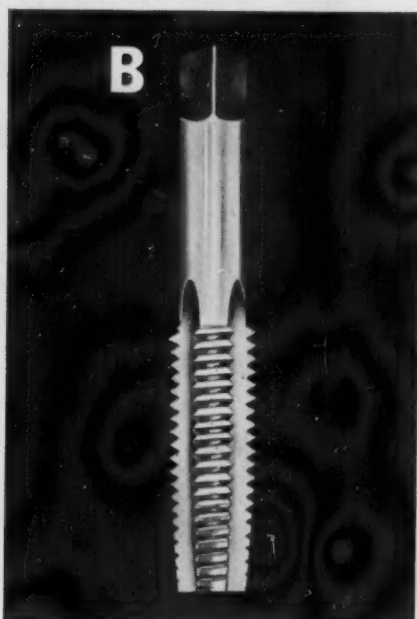
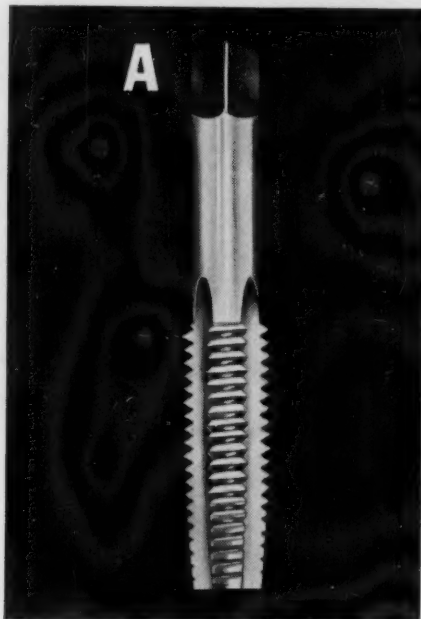
**73. Specialized Tools**

The Walton Co., Hartford 10, Conn. Tap extractors, pipe and stud extractors and toolholders.

**74. Lubrication**

The Waterbury Farrel Foundry & Machine Co., Waterbury, Conn. Lubrication guide for Waterbury Farrel metalworking machinery.

# WHICH OF THESE TAPS COULD NEVER GET PAST HY-PRO'S ELECTRONIC ANALYZER?



The serious defect in Tap B is invisible. But Hy-Pro's Electronic Analyzer detects all structural flaws for your protection.

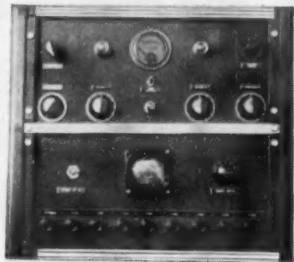
**H**Y-PRO's new Electronic Analyzer is one of the three important steps in Hy-Pro's 3-way *Quality Control*. They are the Electronic Analyzer, advanced Heat Treating and the Micro-Hardness Tester.

Here's how the Electronic Analyzer works. A standard tap, perfect in every detail, is put in one side of the machine. The tap to be tested is put in the other side. Electronic impulses are shot through both taps to analyze

composition, surface condition and internal structure.

The Hy-Pro Electronic Analyzer reveals every defect, including those that laboratory, production tapping and destructive tests fail to uncover!

Get in touch with your nearest Hy-Pro distributor or call us direct. Hy-Pro *quality-controlled* taps—products of the Tap Specialists—cost no more than ordinary taps.



**"The Tap Specialists"**  
New Bedford, Massachusetts, U. S. A.

ADDITIONAL WAREHOUSES:

10439 W. MCNICHOLS RD.  
DETROIT 21, MICH.  
UNIVERSITY 4-1077

1132 LAWLER ST. (WORTH)  
CHICAGO, ILL.  
GARDEN 4-0217

108 EDISON PL.  
NEWARK 5, N. J.  
MARKET 2-4210

For more data circle 320 on Reader Service Card

August, 1956

modern machine shop 164a



It's not always possible to launder *all* chips or filings out of ordinary wiping material. Chips come back to scar men and metal, to plague your production line. This man has already had 4 wiper cuts.

## He had 4 wiper cuts last month



Easy to distribute ...  
always a clean one handy



They really soak up oil ...  
good for solvents, too



When thoroughly used ...  
toss 'em in the trash



Chips can't hide in a clean Scott Wiper. Each Wiper is new, fresh from the carton. A man takes a Scott Wiper as he needs it . . . for his face, his hands, his product.

**. . . He had none!**

***The difference is . . . Scott Wipers***

This is sanitary wiping. A man uses a Scott Wiper thoroughly, throws it away—takes a new one. No danger of cuts from hidden chips . . . no fear of skin infection from dirty wipers . . . when you take a fresh wiper.

With disposable Scott Wipers, handling and distribution are simplified. Laundering, sorting and baling are eliminated.

Your Scott representative or dis-

tributor will demonstrate any time you say. Call him or mail coupon.



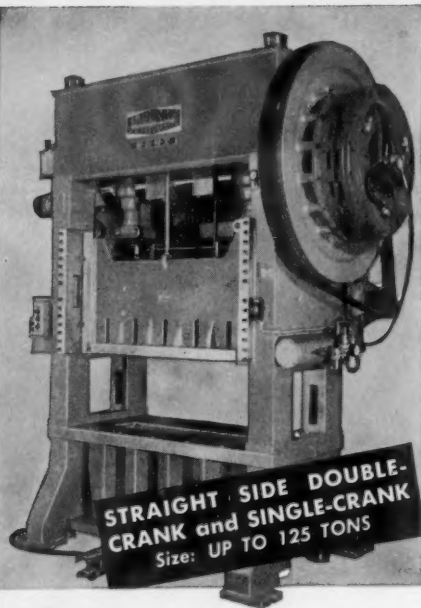
Scott Paper Co., Dept. 5-MM  
Chester, Pa.  
Send information on Scott Wipers.

Name \_\_\_\_\_  
Company \_\_\_\_\_  
Position \_\_\_\_\_  
Address \_\_\_\_\_

# JOHNSON

INTRODUCES

## TWO NEW SERIES of PRESSES



**STRAIGHT SIDE DOUBLE-  
CRANK and SINGLE-CRANK**  
Size: UP TO 125 TONS



**GAP DOUBLE-CRANK**  
Size: UP TO 150 TONS

**Also 22 MODELS OF OBI  
MECHANICAL PRESSES**  
from 16 to 125 Tons Capacity

- Box Type Ram
- Steel Fabricated
- Air Clutch (low inertia)
- Electrical Controls
- Bronze Gibs and Ball Seat
- Air Counter Balance

Write for Bulletin 1956

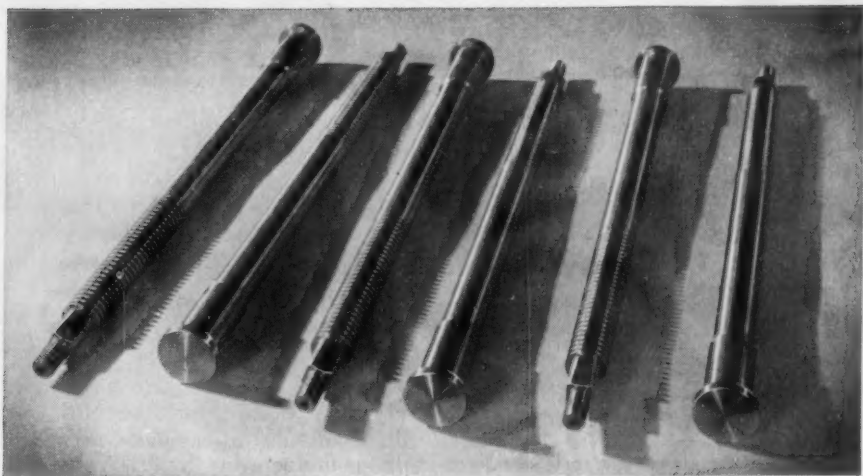
*Johnson*

**MACHINE  
and PRESS CORP.**

620 WEST INDIANA AVENUE • ELKHART, INDIANA

For more data circle 323 on Reader Service Card





Stainless valve stems—turned, die threaded, milled, drilled and polished from Armco 12 FM.

## EVERY PART'S THE SAME With Armco Stainless Steel

Producing parts such as these calls for stainless steel bar stock that machines consistently. That's why the manufacturer of these valve stems specifies Armco 12 FM Stainless Steel.

There are good reasons for the uniform, bar-to-bar, end-to-end machinability of Armco Stainless Steels. Accurate melting procedures protect grade analyses; close heat-treating controls plus continual inspection and testing guard quality.

For complete information on Armco Stainless Steel bar and wire, contact your nearest Armco Sales Office or Armco Stainless Bar and Wire Distributor.

### ARMCO STEEL CORPORATION

1866 Curtis Street, Middletown, Ohio

Sheffield Steel Division • Armco Drainage & Metal  
Products, Inc. • The Armco International Corporation



For more data circle 324 on Reader Service Card



## news of the industry

**New plants and expansions . . . company  
name changes . . . new appointments**

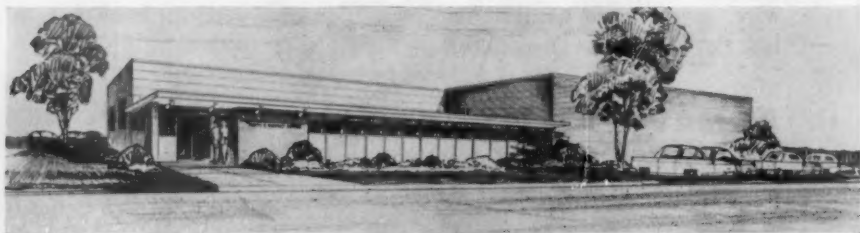
### **NEW PLANT FACILITY FOR PRATT & WHITNEY STERLING DIE DIVISION**

A plant expansion program, that will more than triple the manufacturing facilities of the Sterling Die Division of the Pratt & Whitney Co., Inc., West Hartford, Conn., was recently announced. Plans are being made to erect a modern unilevel factory in the suburban area of Cleveland, Ohio, that will be ready for occupancy on or about October 1st. Located in Cleveland's new Southwest Industrial Park—eight miles southwest of the center of the city and in close proximity to the Cleveland airport, the new Ohio Turnpike and the main line of the New York Central Railroad—the new facility, when completed, will house Ster-

ling's administrative offices, as well as its manufacturing operations. Also, provisions for an ample parking area are being included.

Sterling Die, which became a division of The Pratt & Whitney Company in December is a manufacturer of thread rolling dies. The organization is headed by Herbert T. Yankee, vice president and general manager, who founded the company in 1948. The demand for Sterling specialty products plus a substantial backlog of orders, are claimed to be the major factors that have made this expansion program necessary.

Sterling Die Division's present manufacturing plant, which will be vacated when the move is made to Southwest Industrial Park, is located at 1300 Brookpark Road, Cleveland 9, Ohio.



*Wash drawing of new plant facility for Sterling Die Division, Pratt & Whitney Company.*

## CINCINNATI MILLING AND GRINDING ELECTS TWO VICE PRESIDENTS

Cincinnati Milling and Grinding Machines, Inc., sales subsidiary of The Cincinnati Milling Machine Co., Cincinnati, Ohio, recently elected two new vice presidents; namely, A. H. Dall and Charles M. Reese.

Albert H. Dall began his employment at The Cincinnati Milling Machine Company as a draftsman and machine designer. After receiving his M.E. degree in 1930, he spent one year on engineering standardization work. From 1931 to 1951 he was a research engineer in the research department. Among the research projects, on which he has been employed, are the study of precision grinding, grinder spindle bearings, general lubrication, hydraulics and vibration problems. Several papers on these subjects have been published under his name. From 1947 to 1951 he was director of research. Since 1951, he has been in the engineering design department. Presently, he is direc-

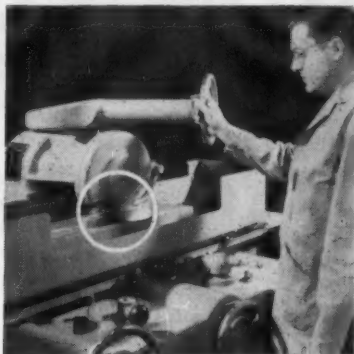
tor of standard machine tool engineering. Mr. Dall is a member of A.S.M.E., the Engineering Society of Cincinnati, and Sigma Xi.

From 1923 to 1928, Charles M. Reese was a cooperative student in the engineering college of the University of Cincinnati. His cooperative work was carried on at The Cincinnati Milling Machine Company. He received the degree of mechanical engineer

## Best for any surface grinder

The Norton  
G BOND-  
32 ALUNDUM\*

*combination outperforms all others*



The Norton vitrified G Bond and 32 ALUNDUM abrasive make an unequalled "Touch of Gold" team for fast stock removal and heavy feeds in precision and semi-precision grinding. Wheels and segments of this bond-and-abrasive combination give you cooler, faster cutting action . . . heavier cuts without burning . . . closer tolerances and smoother finishes . . . more pieces per dressing and more work per wheel.

See Your Norton Distributor for further facts. Or write to the nearest district office of NORTON COMPANY, Worcester 6, Mass. Distributors in all industrial areas. Export: Norton Behr-Manning Overseas Incorporated, Worcester 6, Massachusetts. W-1718



*Making better products...  
to make your products better*

NORTON PRODUCTS: Abrasives • Grinding Wheels • Grinding Machines • Refractories  
BEHR-MANNING PRODUCTS: Coated Abrasives • Sharpening Stones • Behr-cat Tapes

\*Trade-Mark Reg. U. S. Pat. Off. and Foreign Countries

For more data circle 325 on Reader Service Card

# 4 Reasons why you should use **GAMMONS DIE REAMERS**



Specially treated for  
today's modern die  
steels.



Rapid cutting capacity



Tapers per inch .005,  
—.008, —.013 in stock.



Large range of stand-  
ard sizes in stock at all  
times for your conveni-  
ence.

WRITE FOR  
COMPLETE INFORMATION

**GAMMONS • HOAGLUND CO.**

MANCHESTER 2, CONN.  
Manufacturers of helical taper pins, chucking,  
die makers and special reamers.

news of the industry . . .



A. H. Dall (left), Charles M. Reese (right)

upon graduation, and immediately be-  
came a member of the company's ad-  
vertising department. In 1934, he was  
made advertising manager. He has  
served in many capacities in Cincin-  
nati Industrial Advertisers, including  
two years as president. At one time,  
he was chairman of the Meehanite  
Metal Corporation Advertising Com-  
mittee and is now chairman of the  
committee on advertising for Amertool  
Services, Inc., a group of machine tool  
companies selling to Latin America,  
and a member of the advertising com-  
mittee of the National Machine Tool  
Builders Association.

★ ★ ★

## **CRUCIBLE STEEL AND REM-CRU TITANIUM ANNOUNCE JOINT IMPROVEMENT PLAN**

Crucible Steel Company of America  
and its affiliate, Rem-Cru Titanium,  
Inc., have announced a joint \$400,000  
improvement program for increasing  
titanium processing facilities at Cru-  
cible's Park Works in Pittsburgh,  
Pennsylvania. This program is the re-  
sult of the increase in customer de-

For more data circle 326 on Reader Service Card

# 1 Unit...

# 3



## Filtration Processes

- MAGNETIC SEPARATOR
- GRAVITY ATTRACTION
- FILTRATION

# Delpark

# UP-FLO

# MAGNETIC SEPARATOR AND FILTER

...WITH PERMANENT FILTER SCREEN and  
3 COMPLETELY AUTOMATIC CLEANING DEVICES

Combines the new Delpark powerful magnetic separator with a permanent filter media bar stock screen. Swarf bearing liquids flow on top of a large flat magnetic field. Magnetic unit incorporates more Alnico #5 magnets, gives twice the width of field, brings all swarf in suspension within the influence of the magnetic field, puts gravity to work in assisting the magnets and prevents washing and turbidity by using low velocity flow. This feature is particularly desirable on high viscosity fluids.

Three cleaning devices, completely automatic, remove the separated residue from the unit. Chain driven flights remove deposits from the magnetic field and the bar stock screen. .004" bar screen is cleaned

by an air shaker device to dislodge enmeshed particles. A drag-out unit is built into the clean coolant tank.

Up-Flo Filters are available without magnetics for non-ferrous metal applications.

See your Delpark representative for more complete information or write.

# Delpark

FIRST IN  
FILTRATION  
ADVANCEMENTS

**INDUSTRIAL FILTRATION COMPANY**

12 Industrial Avenue  
LEBANON, INDIANA

For more data circle 327 on Reader Service Card

August, 1956

modern machine shop 169

## news of the industry . . .

mand for titanium and titanium alloy sheet, particularly in the aircraft industry. The improvements are expected to increase the capacity for the rolling of titanium sheet by 100 per cent.

Included among the improvements are the installation of a continuous double row furnace for heating titan-

ium slabs, the erection of a new building to house a bar yard and auxiliary titanium processing equipment, and the remodeling of a sheet mill. The improved facilities will be used for titanium processing exclusively.

Rem-Cru titanium is melted at that corporation's Midland, Pennsylvania, plant and processed into standard mill product forms, using many of the Crucible facilities. Large quantities of titanium sheet are

rolled at Crucible's Park Works.

Rem-Cru Titanium, Inc., is owned jointly by Remington Arms Company, Inc., and Crucible Steel Company of America.

★ ★ ★

### NEW COMPANY FORMED

The well-known line of Fastcut cutting tools, formerly products of the Fastcut Division of the Hilton Manufacturing Company, are now being manufactured by the newly organized

## We're Looking for Head Hunters!

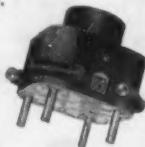


Most machine tool men have long relied upon the "US" Adjustable Multiple Spindle Drill Heads. But we are looking for those who still haven't tried them . . . and who are looking for the best.

With their quick-change universal joint assemblies, they are built for continuous use, with full anti-friction bearing construction for high capacity thrust loads. The universal joint adjustable multiple spindle type is suitable for any sensitive drilling machine. Joints are self-lubricating. All gears are hardened and shaved with spindles superfinished.

The single eccentric type is used for equally spaced holes on bolt circles.

The new double eccentric AdjUStafix, two to eight spindles, permits spindles to be located in non-symmetrical patterns. It eliminates expensive change in set-up.



Universal joint with slip spindle fixed locating plate



Double eccentric type for irregular spacing

**Write** for details on any type of universal joint adjustable head. Ask also about our totally enclosed gear-driven adjustable, fixed center, or individual lead screw tapping heads.

### UNITED STATES DRILL HEAD COMPANY

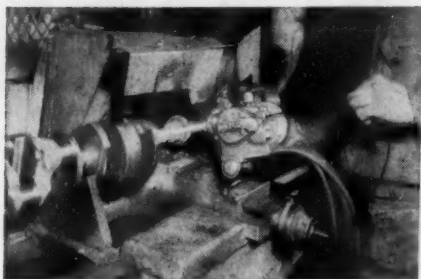
616-618 BURNS STREET • CINCINNATI 4, OHIO

For more data circle 328 on Reader Service Card



Earl W. Bathey

# when mistakes happen...



Automotive crankshaft being brought up to inspection standards with metallizing. This automotive manufacturer formerly used plating for this type of salvage, worked one per hour. With metallizing, the salvage operation requires only 5 to 10 minutes per shaft, including surface preparation.



## Free Bulletin

Get the full story on metallizing in production salvage. Bulletin 57-C describes and illustrates the procedures, provides data on typical parts, with interesting photo-micrographs showing the unique bonding action of Sprabond Wire. Send for a copy.



## Metallizing Engineering Co., Inc.

1177 Prospect Ave., Westbury, L. I., New York • cable: METCO  
in Great Britain  
METALLIZING EQUIPMENT COMPANY, LTD.—Chebham near Woking, England

...and they do in any busy machine shop, there's no need to scrap a mis-machined or otherwise damaged machine part that represents an investment of many expensive man-hours.

Parts like these are brought up to inspection standards quickly, easily and inexpensively with metallizing.

And with the new molybdenum metallizing wire, Sprabond, the only surface preparation required is cleaning. The molybdenum forms a molecular bond with the surface being rebuilt. Little heat is generated, eliminating any danger of warpage.

What's more—users have found that the extreme hardness of the molybdenum coating, and its microscopic porosity which provides superior lubricating characteristics, improve its "wear-ability" over ordinary bearing surfaces as much as 25 times. You haven't just salvaged a part—you've improved it.

The following names are the property of Metallizing Engineering Co., Inc. METCO® • Sprabond Wire

REG. U.S. PAT. OFF.

DOH A. WATSON

METALLIZING ENGINEERING CO., INC.

1177 Prospect Ave., Westbury, Long Island, N. Y.

☐ Please send me Bulletin 57-C.

☐ Please have Metco Field Engineer call.

Name \_\_\_\_\_

Company \_\_\_\_\_

Street \_\_\_\_\_

City \_\_\_\_\_

Zone \_\_\_\_\_ State \_\_\_\_\_

For more data circle 329 on Reader Service Card



## news of the industry . . .

Fastcut Tool Company. Their new plant is located at 7405 East Davison, Detroit 12, Michigan.

Headed by Earl W. Bathey, president, the company is now producing Fastcut Woodruff keyseat cutters, combined drills and countersinks, center reamers and special tools. Fastcut

Tool Company's future plans call for expansion of their present line of standard tools and an increase in facilities for the production of special tools.

★ ★ ★

## LINCOLN ELECTRIC EXPANDS

The Lincoln Electric Co., Cleveland, Ohio, has announced an eight million

dollar expansion to its plant capacity for manufacturing arc welding machines and electrodes. Work is underway to complete two million dollars of this expansion by the end of the year. Engineering on the remainder of the work has already begun. The entire project is planned for completion within the next three years. The expansion will provide 60 per cent more manufacturing capacity in the company's five year, 20 acre Cleveland plant. Extensions will be made to the building for facilities, and new equipment will be installed in existing production areas.

The company is building new plants in France and Australia to

**WORLD'S HARDEST METAL**

● New, improved TALIDE METAL is uniform in quality—gives top performance on ALL cutting, drawing and wear-resistant applications. Write for Catalog 56-G. METAL CARBIDES CORP., Youngstown 12, Ohio.

BLADES

ROLLS

TOOLS

DIES

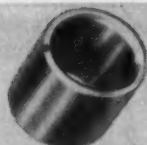
BAR STOCK

METAL CARBIDES CORPORATION  
**TALIDE**  
YOUNGSTOWN 12, OHIO

HOT PRESSED AND SINTERED CARBIDES • VACUUM METALS  
HEAVY METAL • CERMETS • HIGH TEMPERATURE ALLOYS  
OVER 25 YEARS' EXPERIENCE IN TUNGSTEN CARBIDE METALLURGY

A cartoon character is shown running towards the right, carrying a large block of TALIDE metal.

For more data circle 330 on Reader Service Card



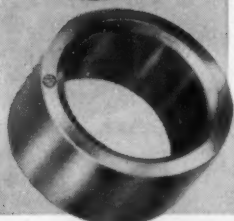
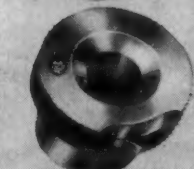
## DRILL JIG BUSHINGS

A-S-A STANDARDS—From Local and Factory Stocks

...of chromium or chromium tungsten oil hardening steels having greater wear resistance than that of regular carbon water hardening steels.

Heat treated in neutral atmosphere, electronically controlled under automatic timing.

Accuracy • Concentricity • 20% Longer Service



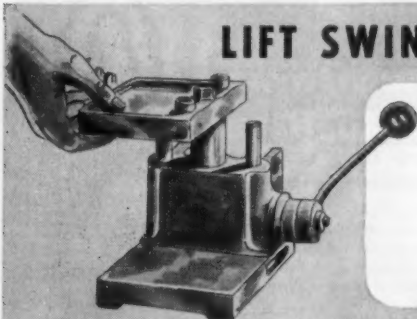
## PRECISION PIERCING PUNCHES

Precision controlled heat treatment and grinding. Made from high alloy steel. Initial high qualities are not reduced by grinding and resharpening.

Head, headless, also "ball lock" types, available in standard sizes from stock. Quick delivery on special sizes.



## LIFT SWING DRILLING FIXTURE



"Swing away" top plate for faster and easier loading.

Back of fixture machined square to base for 90° operations.

Available in full range of standard sizes and with top plates in several styles.

Quick shipment from stocks located in principal industrial centers  
Write us for catalogs of all three

## ACCURATE BUSHING COMPANY

Garwood, New Jersey • SUNset 9-1121

For more data circle 331 on Reader Service Card

## news of the industry . . .

replace the present plants in these countries, and is adding to its Canadian plant.

★ ★ ★

### BRADFORD MACHINE TOOL COMPANY MOVES

Frank B. Stallings of Cleveland, Ohio, has announced the acquisition of

the machine tool and pedestal grinder product lines of the Bradford Machine Tool Company, a 115 year old machine tool building firm of Cincinnati, Ohio. Mr. Stallings also stated that he had purchased part of the manufacturing facilities of this precision plant which would be moved to Lansing, Michigan, to become another "Universal" affiliate. Various Bradford personnel are being moved to Lansing.

A new company has been formed—The Bradford Machine Tool Company

of Michigan—and this company will continue to manufacture the precision, 12, 14 and 16 inch engine and toolroom lathes and pedestal grinders of from 1 to 30 horsepower. R. B. McDowell of East Lansing, vice president of the new firm, will manage this affiliate.

The equipment moved from Cincinnati includes a 30 foot, especially built Bradford lathe, one of the largest in the world, for cutting close tolerance lead screws, along with a "master" Sheffield - built checking machine, which insures lead screw accuracies within the closest tolerances.

Mr. Stallings, as president and principal owner of numerous related manu-

## HARDNESS CONVERSION CHART

### For Every Shop That Does Hardness Testing

This latest and most nearly accurate Hardness Conversion Chart is a necessity wherever hardness testing is done. It has been compiled and produced by CLARK, makers of the internationally respected CLARK Hardness Tester for "Rockwell Testing." Printed on heavy stock convenient for wall mounting, the chart is offered free of charge to hardness tester users. Just attach this ad to your letterhead or write "Send wall chart." A copy will be mailed to you without charge or obligation.

P.S. If you would also like information on CLARK Standard and Superficial Hardness Testers, we'll be glad to send that along too.



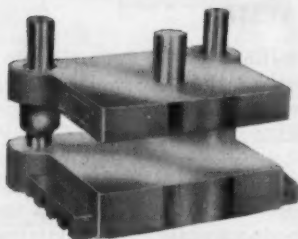
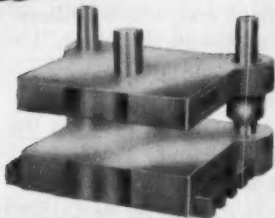
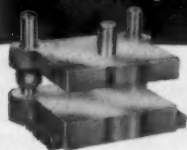
**CLARK**  
INSTRUMENT INC.

**CLARK  
INSTRUMENT  
INC.**

10204 Ford Road  
Dearborn, Mich.  
U.S.A.

For more data circle 332 on Reader Service Card

**A Limitless Range  
of Die Set Sizes  
Jig - Bored  
to YOUR Specifications**



# **SUPERIOR** HAS THEM ALL

## **No Premium Price**

No limitations to so-called "standard sizes" — result no waste — when you use Superior Die Sets. Superior sets are all *individually jig-bored to your specifications*: Result — the number of sizes you can get is almost limitless — you save on excess steel, needless machining, unnecessary weight and handling. Best of all, Superior Die Sets are priced competitively in all given sizes, so you save money in original cost by ordering only the exact size you need.

Check the many other exclusive features of Superior Die Sets and you'll see why they lead the field. Write for catalog and full information.

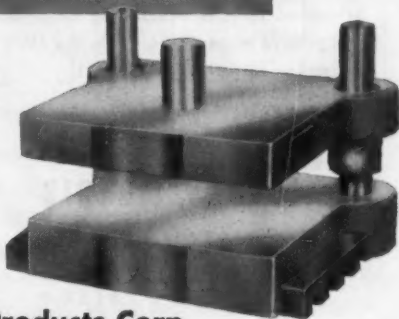
**for fast local service call these  
Expert Superior representatives**

- Kalamazoo, Mich., Phone 5-7988
- Indianapolis, Ind.  
Broadway 3448
- Chicago, Ill., Randolph 6-8871
- Dallas, Tex., Riverside 5138
- Rockford, Ill., Phone 3-3932
- St. Louis, Mo., Jefferson 5-1223
- Milwaukee, Mitchell 5-6037
- Orange, N. J., Orange 5-3810
- Dayton, Ohio, Hamlet 6309
- Memphis, Tenn., Phone 33-7727
- Cleveland, Ohio,  
Kinnear 1-2015

- Eau Claire, Wis., Phone 2-3453
- Minneapolis, Minn., FR 1-1321
- Winter Park, Fla., Phone 5-0464
- New Haven, Conn., LO 2-1731
- Brooklyn, N. Y., NAvarro 8-6690

#### **PLANTS AT**

- Milwaukee, Wis.  
Mitchell 5-6037
- Plainville, Conn.  
Sherwood 7-2701

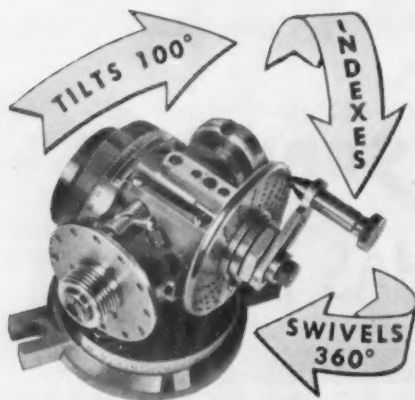


# **SUPERIOR**

**Steel Products Corp.**

2754 So. 19th Street, Milwaukee, Wis.

For more data circle 333 on Reader Service Card



**FOR FASTER PRODUCTION**

## **THE ELLIS**

**DIVIDING HEAD**

Although it is built to fine instrument standards, the ELLIS is a really rugged tool room or production tool that's designed for unusual versatility. Its universal motions — swiveling in two planes — will save time and increase profits and accuracy on your millers, grinders, drill presses and jig borers. It has 6½" swing, or 11" swing when used with riser blocks. Work may be held between centers, or in chucks or collets. To save rehandling of work, and to save money, investigate the ELLIS by writing for complete details!

**N**  
**NICHOLS MORRIS**  
**M**  
**CORPORATION**

**76-H MAMARONECK AVE.  
 WHITE PLAINS, N. Y.**

For more data circle 334 on Reader Service Card

**176 modern machine shop**

### **news of the industry . . .**

facturing companies, has among his "Universal" affiliates, the Novo Pump and Engine Company of Lansing, manufacturers of contractors pumps, hoists and pavement breakers; the Universal Gear Division, which produces the unique Heliocentric speed reduction equipment for the machine tool and materials handling industries; Brown Industries, Inc., of Sandusky, Ohio, gray iron and semi-steel producing foundry; and Sani Septic Systems, Inc., which markets services and equipment related to the sewage treatment field and which utilizes various end products of the other "Universal" affiliates.

★ ★ ★

### **FIRTH STERLING, INC., INAUGURATES NEW CUSTOMER SERVICE SYSTEM**

Firth Sterling, Inc., Pittsburgh, Pa., has announced the reorganization of its Customer Service Division, designed to expedite the processing of all orders. Customer Service handles all sales correspondence on orders, as well as all sales reports, and controls the finished goods inventory in the central and branch warehouses. Complaints and order changes also fall under the jurisdiction of this division. A central filing system, a stenographic pool and a network of inter-company teletype communications are maintained to give vastly improved service to customers. Two turns run on the inter-company teletype communication system to receive late orders from the West and Mid-West. This system makes it possible for stock items to be shipped the same day an order is received, giving prompt and immediate delivery.

**August, 1956**



# Compare

these **BEST BUY** Lempco  
press prices with prices of  
other producers:

Lempco Model No.	25M	50M	75M	100M	150M
Rated Tonnage	25	50	75	100	150
Press Operation	MANUALLY OPERATED				
*LEMPCO	\$315	\$440	\$550	\$1140	\$1200
Competitor "A"	370	631 <sup>a</sup>	679 <sup>b</sup>	(X)	1405
"B"	375	515	645	1430	1650
"C"	(X)	565 <sup>a</sup>	695	1365	1690
"D"	386	591	788	1541	(X)
Lempco Model No.	25 E-2	50 E-2	75 E-2	100 E-2	150 E-2
Rated Tonnage	25	50	75	100	150
Press Operation	2 H. P. PUMP UNIT				
*LEMPCO	\$825	\$875	\$1050	\$1720	\$1920
Competitor "A"	(X)	(X)	(X)	(X)	(X)
"B"	1430	1430	1650	(X)	2640
"C"	(X)	(X)	(X)	(X)	(X)
"D"	1147 <sup>c</sup>	(X)	(X)	(X)	(X)



Model 50-E, 50-Ton Electrically Operated Hydraulic Press

Lempco Model No.	25 E-7	50 E-7	75 E-7	100 E-7	150 E-7
Rated Tonnage	25	50	75	100	150
Press Operation	7-1/2 H. P. PUMP UNIT				
*LEMPCO	\$1150	\$1200	\$1380	\$2050	\$2250
Competitor "A"	(X)	(X)	(X)	(X)	(X)
"B"	(X)	(X)	(X)	(X)	(X)
"C"	(X)	1586	1716	2428	2713
"D"	1375 <sup>c</sup>	1414	1623	2402	(X)

\*Prices effective April 15, 1956 . . . F.O.B. Lempco Plant, Bedford, Ohio . . . Prices subject to change without notice.

## NOTE:

HYDRAULIC PRESS PRICE COMPARISONS ARE FOR EQUAL OR CLOSELY SIMILAR SPECIFICATIONS. (X)—No Model Listed; a—60-Ton Listed; b—80-Ton Listed; c—30-Ton Listed. Entries Indicate Nearest Reasonably Equal Specification Known to be Offered. Prices and Specifications are Effective, to the Best of Our Knowledge, on or about April 15, 1956.

# LEMPCO

## INDUSTRIAL, INC.

WHERE *QUALITY* CONTROLS





**Micro**  
*Spray*

**LAY-OUT DYE**

(Purple)

MICCRO Lay-Out Dye, long the leader in its field, now available in an AEROSOL package for SPRAYING.

All the advantages—instant drying; clear, sharp lines—*plus* easy-to-use, dependable, efficient MICCRO Spray container.

Regular MICCRO Supreme Lay-Out and Identification Dye in seven distinctive colors available as always in brush-in-cap and conventional containers.

*Write for circular  
on company letterhead*

**MICHIGAN CHROME  
& CHEMICAL COMPANY**

8615 Grinnell Ave., Detroit 13, Mich.

For more data circle 336 on Reader Service Card

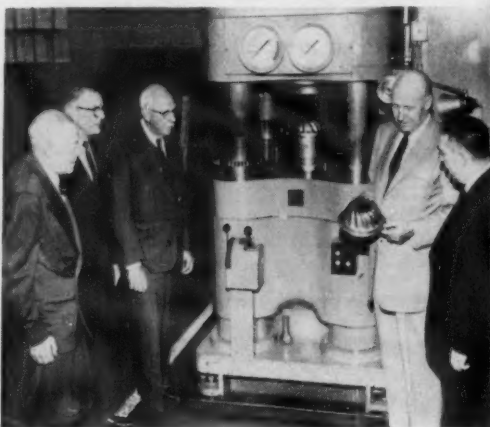
178 modern machine shop

news of the industry . . .

## COMMERCIAL COMPANY EXECUTIVES INSPECT FORMING EQUIPMENT AT "MILL"

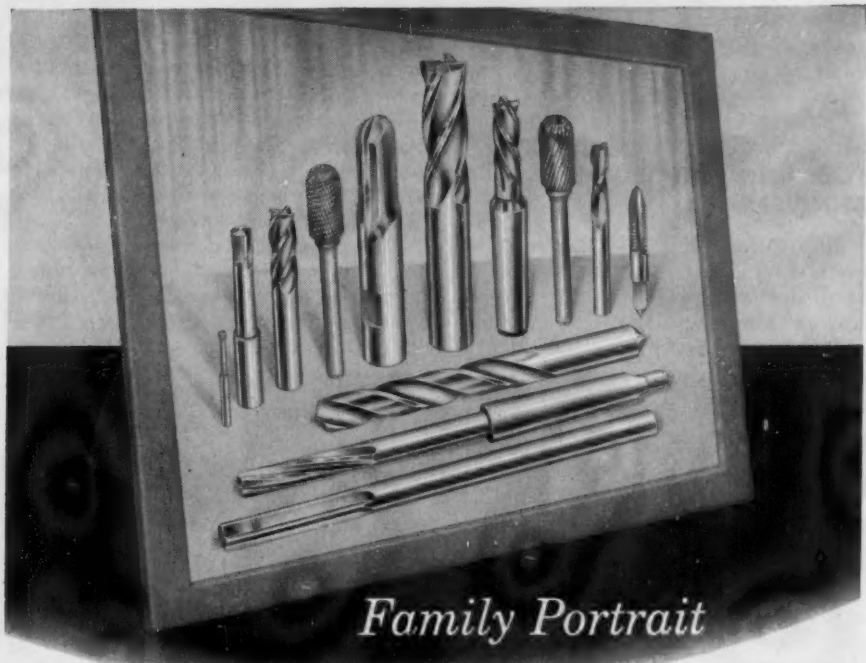
Officers and directors of the Commercial Shearing and Stamping Company, of Youngstown and Chicago, manufacturer of pressed metal products and hydraulic equipment, recently visited The Cincinnati Milling Machine Company, Cincinnati, to examine several machines they have purchased.

In the accompanying illustration, E. D. Vancil, (second from right), vice president of The Process Machinery Division, Cincinnati Milling Machine Company, is shown demonstrating the operation of a 12 inch Hydroform machine to Commercial Company executives; (left to right) Robert Procter, vice president-general manager; Herbert Wollison, vice president; Ward Beecher, vice president; Charles B. Cushwa, Jr., president of Commercial.



E. D. Vancil (second from right), Cincinnati Milling executive, demonstrates Hydroform machine to Commercial Company officials.

August, 1956



## *Family Portrait*

# of **PRATT & WHITNEY** *Solid Carbide Cutting Tools*

but here's what the camera DIDN'T catch . . .

*all* the types and sizes in our Solid Carbide line . . . that'd take a family album. It doesn't show the years of cutting tool know-how, experience and research that go into every tool (though it's easy to see how this extra quality saves money on your production lines). Out of camera range, too, was P&W Engineering Service that makes sure every P&W Carbide Tool you buy is exactly right for *your* specific jobs. If one picture's worth 1000 words, we believe one sample of P&W Carbide Tools performance is worth 1000 pictures . . . so ask a P&W Cutting Tool Representative to *show* you.



**PRATT & WHITNEY COMPANY**  
INCORPORATED

25 Charter Oak Boulevard, West Hartford, Conn.  
Direct Factory Representatives In Principal Cities

**MACHINE TOOLS • GAGES • CUTTING TOOLS**

For more data circle 337 on Reader Service Card

news of the industry . . .

## DAYTON ROGERS CELEBRATES STAMPING DISTRIBUTION ANNIVERSARY

July 15th marked the 25th anniversary of the national distribution of small lot stampings by the Dayton Rogers Manufacturing Co., Minnea-

polis, Minnesota. It was on that date that the first national distribution of short-run stampings was presented in this country on a commercial basis. Previous to that, the Dayton Rogers activity was limited to the immediate area of Minneapolis, St. Paul and the close surrounding territory.

From a small beginning, the company now operates a modern plant, employing approximately 350 people, working the greater part of two shifts.

Two or three companion lines have been added by the company.

Dayton A. Rogers is president and general manager, with an engineering force consisting of David Dulebohn and Robert Gold. A. M. Bakken is sales manager. The company has 20 offices in principal areas and the majority of the time of these sales representatives is devoted exclusively to the Dayton Rogers activity. Present daily production calls for a schedule of 90 to 125 new short-run dies per week, which are produced on a semi-production basis, with a very careful inspection quality controlled combination supervision and inspection department.

Now you can  
**PRODUCE FASTER  
FOR LESS**

with this 100-ton  
**FEDERAL**  
air-clutch press



These modern Federal Presses have what it takes to step-up production and cut unit costs! Their safe, precision, fatigue-free operation at *high speeds* may be attributed to the fast-acting clutch plus other outstanding features. Dual-solenoid safety valve. Non-repeat mechanism. "Inching" control. Continuous as well as single-cycle operation. In 6.6 to 100-ton capacities. Write for new catalog showing complete line.

**FEDERAL PRESS COMPANY**  
604 Division St., Elkhart, Ind.

No. 8 Gear Type

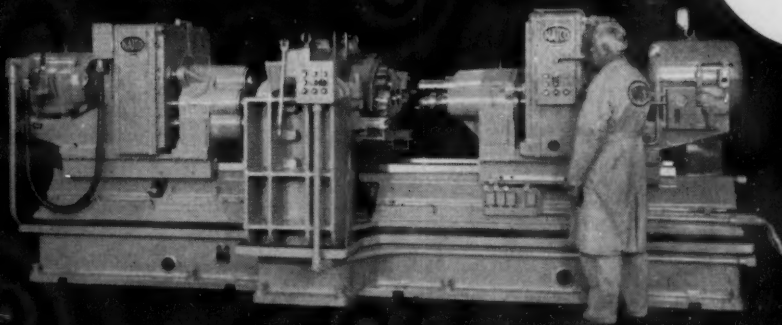
**FEDERAL** *Overlook  
Indemnity* **PRESSES**

31 Years of Quality Construction

For more data circle 338 on Reader Service Card

# Natco<sup>®</sup> Automatic Matches Boring Mill Accuracy

*and quickly converts for five different jobs*



This Natco two-way machine stepped in where automatics "fear to tread!" It replaced a precision boring mill, speeded production and didn't give up a tenth in accuracy! At The Frank G. Hough Co. boring mills were used for exacting tolerances on transmission parts for the Hough Payloader<sup>®</sup>. Higher production was desired.

Now with a Natco two-way automatic, Hough is getting production rates—not job shop rates. The Natco bores diameters to within .0005"—square with mounting face within .0005" per inch bore length. The machine also chamfers, counterbores and notches boss contours.

Versatile too! Hough processes five different transmission housings or covers with a single machine. After a typical production run averaging 100 parts, the machine is quickly converted to another job.

Ask for information about the PAYD (Pay-As-You-Depreciate) Finance Plan.

Call Natco offices in  
Chicago, Detroit, Buffalo,  
New York, Boston,  
Philadelphia, Cleveland  
and Los Angeles;  
distributors in other cities.

## National Automatic Tool Company, Inc.

Richmond, Indiana

Multiple-spindle drilling, boring, facing and tapping machines. Special machines for automatic production.



news of the industry . . .

### VALENITE METALS CORPORATION TO EXPAND

Valenite Metals Corp., Madison Heights, Mich., will expand plant facilities to triple its present size this summer. While Valenite's tungsten carbide tips and tools have only been in production for a year and a half, the plant must be expanded to keep ahead of orders. Although the plant was originally planned to operate for five years before expansions or additions to equipment became necessary, acceptance of the new tool material has forced the expansion far ahead of schedule. Footings have already been poured on the Madison Heights site, and construction is expected to be completed by fall without any disruption of the present processing setup.

### GREENFIELD TAP AND DIE TO ACQUIRE HORTON CHUCK DIVISION

An agreement has been reached by Greenfield Tap and Die Corporation to purchase all of the assets of the Horton Chuck Division of E. Horton and Son Co., Windsor Locks, Conn. The firm, which has been in business since 1851, is the oldest chuck company in the world.

For the present, manufacturing operations will continue in Windsor Locks, and no immediate changes in sales policies are contemplated. D. H. Thomson will continue as general manager of the Horton Chuck Division and G. S. Chiaramonte as division sales manager.

In the past, Horton Chuck has endeavored to expand by re-investing a major portion of its earnings in new equipment but it had become apparent to their stockholders and manage-

*Greenerd*  
**HYDRAULIC PRESSES**

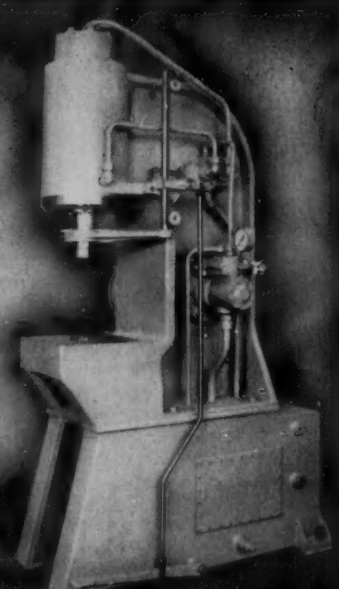
**for**

- ASSEMBLING
- BROACHING
- FORMING
- MOLDING
- STRAIGHTENING

Hydraulic presses made to conform to J.I.C. standards. Pictured at right is 15-ton hydraulic press.  
Write for Catalog 554.

**GREENERD ARBOR PRESSES**

NASHUA • EST. 1883 • NEW HAMPSHIRE



For more data circle 340 on Reader Service Card



# AMES



## Check Motions or Dimensions In .001" up to 10" Range.

With Ames Long Range Dial Indicator models you can measure in .001", long slide travel, large cams, deep recesses or other dimensions requiring indicator spindle travel of up to 10". Also they have all the advantages built into Ames regular indicators:—large diameter dials, widely spaced dial graduations; movable dials; replaceable contacts, count hands to indicate revolutions of the indicator hand.

Send your problem in long range measuring, Ames will be glad to suggest a solution.

*Representatives in principal cities*



## B.C. AMES CO.

29 Ames Street, Waltham 54, Mass.

MANUFACTURER OF MICROMETER DIAL GAUGES • MICROMETER DIAL INDICATORS

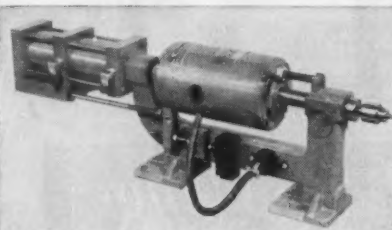
For more data circle 341 on Reader Service Card

August, 1956

modern machine shop 183



# AUTOMATIC DRILL UNIT



**Complete, Compact  
ELECTRIC MOTOR SPINDLE  
with Hydraulically Controlled  
Air Cylinder Providing Feed**

**3 SIZES** cover Drilling Range  
from No. 80 to  $\frac{1}{2}$ " . . . .  
Units can be Mounted in Any  
Position to Build Special  
Machines.

Model 111...#80 to  $\frac{1}{8}$ "...2,500 to 15,000 rpm  
Model 113... $\frac{1}{16}$ " to  $\frac{1}{4}$ "...2,000 to 13,800 rpm  
Model 603... $\frac{1}{8}$ " to  $\frac{1}{2}$ "...600 to 4,000 rpm

Write for Descriptive Bulletin  
and Prices

**The ELECTRO-MECHANO Co.**  
265 E. ERIE ST. MILWAUKEE 2, WIS.

For more data circle 342 on Reader Service Card

## news of the industry . . .

ment that substantial additional capital would be required to carry on the company's sustained growth, due to new developments of very large diameter chucks for the aircraft industry and automation equipment and also to expand inventory of their regular line. The division needs more and larger equipment but found that expansion would be difficult to accomplish at a rate to meet customer demands without the assistance which Greenfield is able to supply.

★ ★ ★

## DETROIT BROACH CHANGES NAME

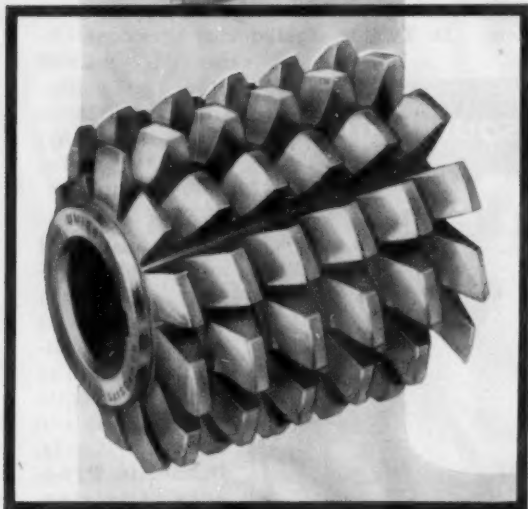
Detroit Broach Co., Inc., Rochester, Mich., has changed its name to Detroit Broach & Machine Company.

It was pointed out that the new name is more indicative of the company's present activities because it has become a major factor in the design and manufacture of broaching machines, since entering this field in 1952. The company was founded in 1934 for the manufacture of broaching tools, and occupied plants in Detroit before moving to its present 82,000 square foot building located on 12 acres of land in Rochester, Michigan, in 1952.

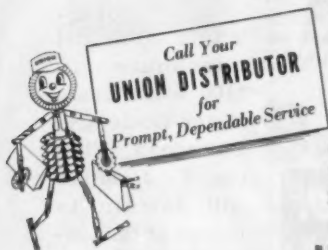
## More Information?

**For additional information  
on any product mentioned  
in this issue, please use the  
READER SERVICE CARDS  
opposite pages 32 and 324.**

**A DIVERSIFIED LINE OF QUALITY!**



# UNION



There's a UNION HOB ready to do the job for you, accurately and economically. UNION offers a complete selection of top quality hobs, standard and special, to suit the requirements of your job.

**UNION TWIST DRILL COMPANY**  
ATHOL • MASSACHUSETTS

*Owners and Operators of: S. W. CARD CO. DIVISION, Mansfield, Mass.,  
BUTTERFIELD DIVISION, Derby Line, Vermont and Rock Island, Que.*

For more data circle 343 on Reader Service Card

## industry news in brief . . .

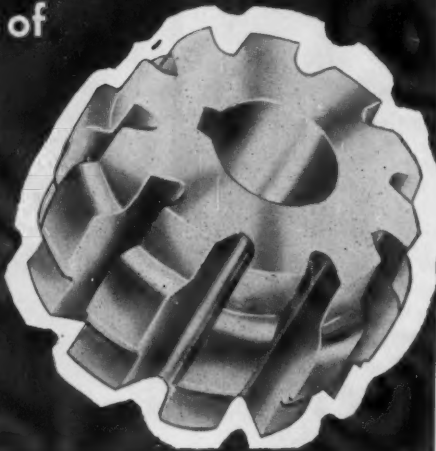
**Rudel Machinery Company, Inc.**, 100 East 42nd Street, New York, N. Y., appointed distributor in eastern New York, northern New Jersey, Connecticut and western Massachusetts, **Norton Company**, Worcester, Massachusetts. **Homer L. Gibbs** appointed field engineer at the St. Louis office. **Ken-**

**neth F. Ebbeson** appointed abrasive engineer in Boston area.

**William L. Martin** named sales manager, **Potter and Johnston Company**, West Hartford, Connecticut.

**D. M. Stevenson** elected vice president—sales; **G. A. Goepfrich** elected vice president—engineering; and **R. D. Twohig** elected vice president—financial, legal and other staff activities; **The Skinner Chuck Company**, New Britain, Connecticut.

Here's a good source for  
All Types of  
FORM  
RELIEF  
MILLING  
CUTTERS



Built to meet your special requirements and delivered promptly by the "world's busiest" manufacturers of cutting tools! A trial order will convince you.

*Send your blueprints for  
prompt quotations.*

**B & W PRECISION PRODUCTS CO.**

11393 E. Eight Mile Rd., P.O. Box 3865, Detroit 5, Mich.

For more data circle 344 on Reader Service Card

**Machinists Tool and Supply Company**, 3690 Santa Fe Avenue, Los Angeles 58, California, selected to handle **Diamonite** oxide turning and cutting tools, **Diamonite Products Division**, United States Ceramic Tile Company, Canton, Ohio.

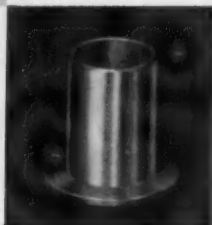
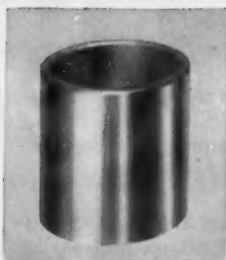
**Henry Disston Division**, **H. K. Porter Company, Inc.**, has moved its Chicago branch office and warehouse to 1100 West Washington Boulevard, Chicago 7, Illinois. **V. J. Miller** will remain in charge of the Chicago operations.

**THESE NEW**

# **Bunting®**

**BEARINGS MAY SOLVE**

**YOUR COST PROBLEM**



A more complete, advantageous bearing service than has heretofore existed came into being when Bunting added self-lubricating sintered powdered Bronze Bearings to the long established line of Bunting Cast Bronze Bearings and Bars. These new Bunting sintered bronze plain, flange and thrust bearings and bars are made to Bunting's traditional high standards of quality and precision. They embody knowledge gained in long and varied experience in manufacturing Bronze Bearings for all applications in the mechanical industry. They fully meet modern requirements.



Bunting Sintered Bronze products will be manufactured and distributed in the same responsible manner that has established Bunting leadership in the field of Cast Bronze Bearings. Use them with confidence.

BOTH Bunting Cast Bronze and Bunting oil filled, self-lubricating sintered powdered Bronze Bearings and Bars are available to you through your nearest Bunting Distributor. He has in stock all sizes for your immediate needs. Ask him or write for complete lists and dimensional data on Bunting Cast Bronze and Bunting Sintered Bronze Bearings.

# **Bunting®**

**BUSHINGS, BEARINGS, BARS AND SPECIAL PARTS  
OF CAST BRONZE AND POWDERED METAL**

The Bunting Brass and Bronze Company • Toledo 1, Ohio • Branches in Principal Cities • Distributors Everywhere

For more data circle 345 on Reader Service Card



## industry news in brief . . .

**Alton K. Marsters** elected vice president in charge of sales, **Bausch and Lomb Optical Company**, Rochester, New York.

**Harold R. Burton** has joined the sales staff of **The Billings and Spencer Company**, Hartford, Connecticut.

He will cover the northern Ohio and western Pennsylvania territory, with headquarters in Cleveland.

**Edward N. Clark** promoted to assistant to the factory manager of cutting tool and gage divisions, **Pratt and Whitney Company, Inc.**, West Hartford, Connecticut. **Ralph Winspear** named superintendent of cutting tool division. **Richard D. Keller** appointed assistant sales manager of the machine tool division.

**Nelson and Storm Tool Supply Company**, 2303 Eleventh Street, Rockford, Illinois, and **Couch and Heyle, Inc.**, 1016 South Adams Street, Peoria, Illinois, appointed distributors, **Scully-Jones and Company**, Chicago, Illinois.

**Charles V. Stevens** appointed sales manager, **S. W. Card Manufacturing Company**, Division of Union Twist Drill Company, Mansfield, Mass.

**Clarkson and Foreman, Inc.**, New York, N. Y., appointed exclusive representatives, **The Van Keuren Company**, Watertown, Massachusetts.

**DUSTKOP**  
**STOPS DUST**

**DUST COLLECTORS**

37 STANDARD MODELS

**SAVES INSTALLATION TIME**

Stop dust quickly, at lower cost, with Dustkop. Thirty-seven standard models ready to use and available from stock. Dustkop conserves floor space, reduces maintenance. Collects almost all types of industrial dusts. Write for descriptive literature.

Also a complete line of Mist Collectors

**AGET MANUFACTURING COMPANY**  
1398 East Church St. • Adrian, Michigan

For more data circle 346 on Reader Service Card

**Here's a brand-new "2-in-1"  
abrasive tool by BUCKEYE**



**handles like  
an angle...**

**runs like  
a vertical...**

**for 4", 5", 6" cup wheels  
for 5", 7", 9" sanding pads**

Take hold of this newest Buckeye abrasive tool . . . it has the feel and balance, and the ease of handling you expect only in an angle tool. And—it has the gearless efficiency and direct air flow of a vertical tool.

Now, turn it on. That handy twin-trigger throttle gives you pin-point control of the air flow from zero right on up to top speed. Notice how quietly it runs? That's the built-in muffler doing its job. The exhaust deflector, underneath, can be adjusted to any angle you choose.

This NEW Buckeye abrasive tool is available in five speeds, comes complete with dead handle and guard. If you'd like more information, just write—now—for our Catalog A-10. If you'd like to see what this new tool can do on your work, just tell us so and we'll make the necessary arrangements—without obligating you at all.

**Buckeye Tools**  
CORPORATION

**DIVISION 17 • DAYTON 1, OHIO**

producers of  
the world's first  
successful  
rotary air tools

For more data circle 347 on Reader Service Card



## industry news in brief . . .

Leonard H. Clark named assistant to vice president — sales, Standard Pressed Steel Company, Jenkintown, Pennsylvania.

Edward A. Baker, Jr., added to sales department, Palmer-Shile Company, Detroit, Michigan. Charles R.

MacDonald named head of new Chicago district sales office.

Andrew E. Josephson appointed production manager and director of purchasing, Jarvis Power Tools, Inc., Middletown, Connecticut.

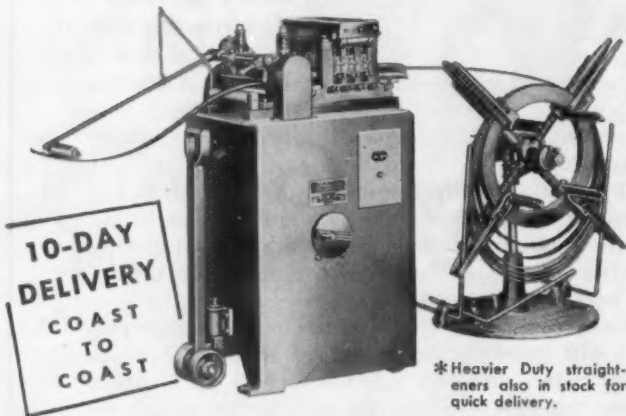
J. Robert Jones elected vice president in charge of sales, Kearney and

Trecker Corporation, Milwaukee, Wisconsin. H. W. Kippers selected sales manager of standard machinery division. Carl F. Enroth appointed to a similar post in the special machinery division.

R. O. Peterson elected vice president, brush division — engineering, Osborn Manufacturing Company, Cleveland, Ohio.

R. E. Christie, vice president, Crucible Steel Company of America, Pittsburgh, Pennsylvania, died recently at New Rochelle, New York. Mr. Christie had been associated with Crucible since 1901, one year after the company was formed.

### STRAIGHTEN COIL STOCK from ½" to 8" wide... from .018" to .065" thick... on a LITTELL "308"\*



\*Heavier Duty straighteners also in stock for quick delivery.

Littell "308" Variable Speed Straighteners flatten coil stock...synchronize feeding of stock with speeds of automatic presses . . . simplify hand feeding. The "308" has brought new speed, efficiency and economy into stamping, blanking and shearing operations from coast to coast. Get full details on these portable straighteners.

Write for Catalog Section 3H



Speed  
with Safety

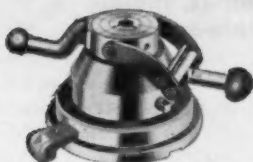
ROLL FEEDS • COIL CRADLES  
STRAIGHTENING MACHINES  
REELS • AIR BLAST VALVES  
District Offices: Detroit, Cleveland

4163 N. RAVENSWOOD AVE. • CHICAGO 13, ILL.

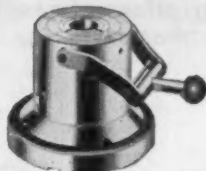
For more data circle 348 on Reader Service Card

# ***Zagar Tools***

## **HOLD YOUR WORK—AND YOUR BUSINESS!**



Collet indexing fixture



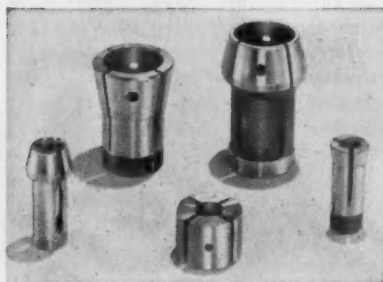
Collet holding fixture



Vertical-horizontal  
collet fixture

### **ZAGAR HOLDING and INDEXING FIXTURES**

Zagar fixtures offer you a most inexpensive way to machine small parts. Set-up is speeded and much special tooling eliminated. Slot milling, straddle milling, drilling, tapping and grinding of small pieces can be done most profitably with Zagar fixtures, available from stock.



### **COLLETS, PADS, BLANKS**

Five types: No. 310 Zagar Master; Nos. 2 and 6 W. & S.; No. 5-C; No. 6 W. & S. pads. All but Zagar No. 310 are standard machine tool sizes. All collets are made of oil-hardened special steel; have flat tops for locating purposes.

Write for Engineering Sheets  
"S-8" on each product.

### **ZAGAR, INC.**

23898 Lakeland Blvd., Cleveland 23, Ohio



**TOOLS FOR INDUSTRY  
and SPECIAL MACHINERY**

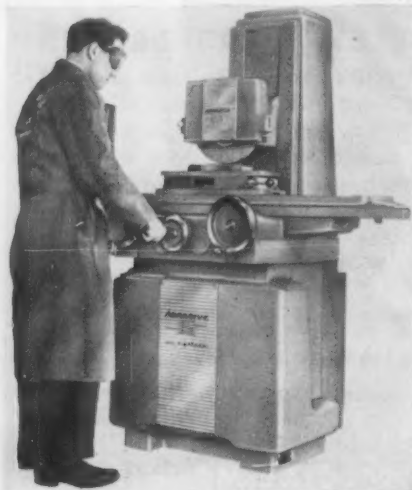
For more data circle 349 on Reader Service Card

## new shop equipment

**Descriptions of new machines, tools  
and materials for metalworking.**

### **PRECISION SURFACE GRINDER HAS THREE NEW CONSTRUCTION INNOVATIONS**

Abrasive Machine Tool Co., East Providence, R. I., has unveiled an entirely new precision surface grinder, the Abrasive 618. Three innovations highlight the new grinder: new size, new design and new features for precision accuracy in grinding operations.



**Abrasive Model 618 Precision Surface Grinder**

The size is 6 inches x 18 inches x 12 inches and is in keeping with today's industrial demand for a small, yet rugged, precision surface grinder that is easy to operate and maintain.

Smooth, futuristic lines, coupled with unique construction design, give the grinder an ultra-modern appearance that matches its modern hand feed operational ease and precision.

To provide positive grinding control, new roller-bearing ways, a back-lash eliminator on the saddle feed and a unique table cable and drum drive have been incorporated in the No. 618 design. These three features have been impressively proven in rugged testing which involved over one million reversals under actual work loads.

For more data circle 75 on Reader Service Card

★ ★ ★

### **24-INCH SPEED SHEAR**

A new 24 inch production shear, announced by The Lodge & Shipley Co., 3058 Colerain Ave., Cincinnati 25, Ohio, is said to be the only one of its type, built for fast, heavy-duty power shearing. It has a blade length of 24 inches, a throat 7½ inches deep and capacity up to 1⅛ inch in mild steel. It

operates at speeds up to 120 strokes per minute and is remarkably compact—72 inches high, 50 inches wide and deep. Built for utmost versatility in small sheet shearing, the 24 inch speed shear will do straight and angle shearing, sequence shearing, slitting, notching, blanking and accurate duplication of straight-side parts without dies. The special "end-around" table extends around the left end of the blade for convenience in notching and slitting. The entire table is provided with tapped holes for quick, accurate set-up of protractors, clamps and cutting guides. For conventional shearing, the speed shear has a front-operated back gauge.

Among the important features of the new shear are: all adjustments in front, table designed for sit or stand operation, counter thrust slide for burr-free cutting, perfected solenoid-operated safety clutch, rugged steel plate construction, adjustable holddown fingers with molded neoprene cups, work chute discharges to front or rear, foot control switch and machine mounted push

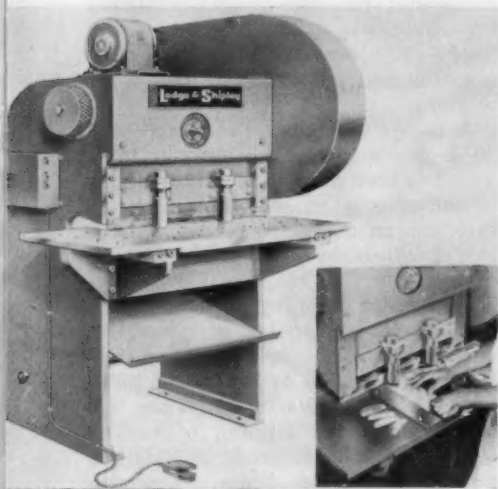
buttons, selective operation, continuous or single stroke cutting, see-through finger guard, fully enclosed drive, fluorescent light gauge which illuminates table and provides for shearing to a scribed line. The shear is complete and ready to operate. It is furnished with a 1½ h.p. drive motor and three-belt vee drive. Protractor and guides for cutting are furnished. Capacities listed by the manufacturer include ⅛ inch in mild steel, 3/32 inch in stainless steel and 7/32 inch in duraluminum.

For more data circle 76 on Reader Service Card

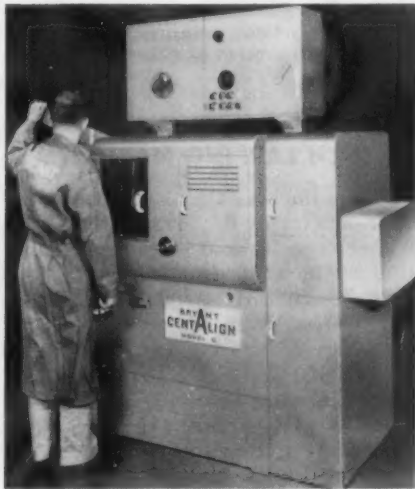
★ ★ ★

### INTERNAL GRINDER FEATURES FAST STOCK REMOVAL AND UNUSUAL ACCURACY

Bryant Chucking Grinder Co., P.O. Box 620-D, Springfield, Vt., has announced the introduction of a new internal grinding machine; namely, the Bryant "Centalign" Automatic Inter-



View of Lodge & Shipley 24 Inch Speed Shear



Bryant Centalign Automatic Internal Grinder

## **new shop equipment . . .**

nal Grinder, which employs new principles of construction for greater rigidity and stability. The "Centalign" is said to be capable of fast stock removal and unusual accuracy.

Features of the machine include workhead, wheelhead and longitudinal and cross slide motions of the wheel-slide in one common plane, to reduce deflections to a minimum, and to insure better alignment; vibration absorbers incorporated in the fabricated bed, to dampen all forces, and assure fine finishes and consistent accuracy.

The "Centalign," which has a 10 inch swing and 1 inch grinding stroke, was designed for long-run, high-production grinding of bearing raceways and taper bores and for similar operations on various work parts. It embodies the latest developments in shoe centerless grinding, and is adapted to automated lines. However, the control of machine function by programming cam sets, which can be readily interchanged, makes certain types of recurring short-run operations feasible.

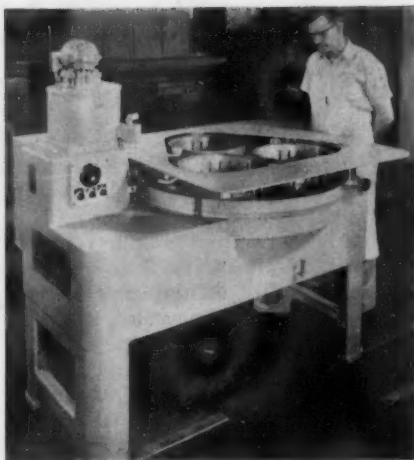
For more data circle 77 on Reader Service Card

★ ★ ★

### **36 INCH LAPPING MACHINE**

Crane Packing Co., 6400 Oakton St., Morton Grove, Ill., has announced a higher capacity and larger part handling 36 inch Model Lapmaster Lapping Machine. It is now available as part of the "John Crane" line of Lapmasters ranging from 12 to 72 inch lap plate diameter.

Inside diameter of the conditioning rings is 14½ inches, thus permitting handling parts up to that size. Capacity-wise, the machine will take well over twice as many 1 inch parts as the 24 inch model. The roller bar attach-



**"John Crane" Lapmaster Lapping Machine**

ment has been designed to provide the operator with shelf space pressure plates or fixtures.

The drain hole on the 36 inch Lapmaster is on the side, and a wiper blade is fastened to the underside of the base table to bring all of the spent compound into the drain. A rubber hose, fastened to the drain plug, allows a container to be placed under the machine and conveniently out of the way.

A fork style agitator is placed at a 30 degree angle in the agitator tank. This has been done to facilitate mixing of abrasive when left loaded in the tank for an overnight period. This is said to eliminate strain on the agitator motors.

Lapmaster lapping machines are claimed to be capable of generating surface flatness to less than one light band and finishes to 2 r.m.s. in short or high production runs. They are widely used for lapping of various types of parts. Materials include monel, steel, stellite, brass, aluminum, carbon, plastics and ceramics.

For more data circle 78 on Reader Service Card



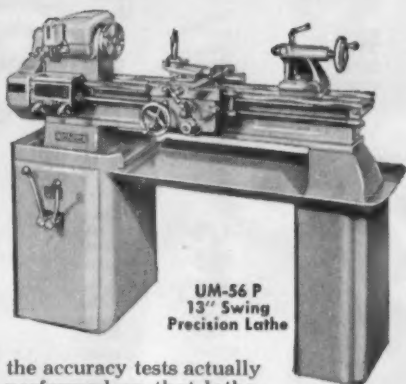
# SHELDON Precision LATHES

## for the size Lathes You Need Most

Sheldon lathes are built in the sizes you need most, for toolroom and production jobs. They are available with swings of 10", 11" and 13" . . . in varying bed lengths with 18" to 48" center distances . . . and . . . in your choice of pedestal, cabinet or bench mountings.

Powerful, all-V-belt, drive units—either the standard 8-speed (or 16-speed) E-drive; or the production favorite, a rapid, lever-shift U-drive. Where higher spindle speeds are desired, the standard E-drive can be built to provide speeds up to 2,000 r.p.m.

All Sheldon Lathes have handscraped, built-in precision. Each lathe is guaranteed to meet or surpass the American Standards for Toolroom Accuracy. With every Sheldon Lathe goes a copy of

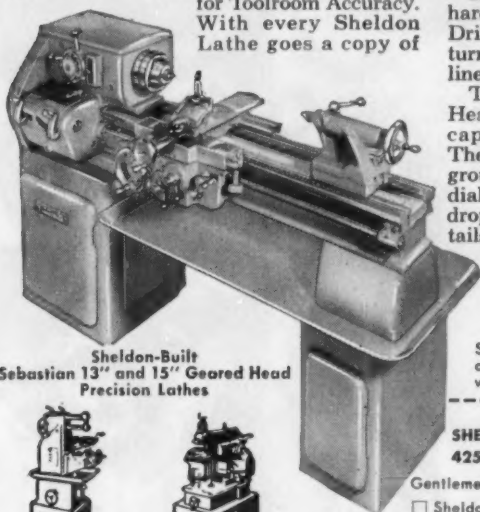


UM-56 P  
13" Swing  
Precision Lathe

the accuracy tests actually performed on that lathe. (19 checks).

Important optional features include: hardened bed ways, L00 Long Taper Key Drive spindles, 4" D1 Camlock spindles, bed turrets, taper attachments and a complete line of toolroom and production accessories.

The new Sheldon-built Sebastian Geared Head Lathes have greatly increased work capacity and many advanced features. These include a wide, heavy, hardened and ground bed . . . easy shifting spindle speed dial . . . 60-pitch gear box . . . independent drop lever apron clutches . . . cam-action tailstock clamp . . . and, automatic lubrication in the headstock and apron with "1-shot" lubrication of carriage.



Sheldon-Built  
Sebastian 13" and 15" Geared Head  
Precision Lathes



SHELDON  
Horizontal Milling Machine



SHELDON  
12" Shaper

### SHELDON MACHINE CO., Inc.

Builders of Sheldon Lathes, Milling Machines,  
Shapers and Sebastian Lathes.

4250 North Knox Ave., Chicago 41, Ill.

Send in coupon or write for catalogs and names of nearest Sheldon and Sebastian Distributors where you can see these new lathes in operation.

#### SHELDON MACHINE CO., INC.

4250 North Knox Avenue, Chicago 41, Illinois

Gentlemen: Please send new catalogs describing:

- ☐ Sheldon ☐ 10", ☐ 11" ☐ 13" Lathes  
☐ Sebastian 13" and 15" Geared Head Lathes  
☐ Horizontal Milling Machine ☐ Name of Local Dealer  
☐ Sheldon 12" Shaper ☐ Have representative Call.

Name ..... Title .....

Company Name .....

Street Address .....

City ..... State .....

☐ Company  
Home  
State

For more data circle 350 on Reader Service Card

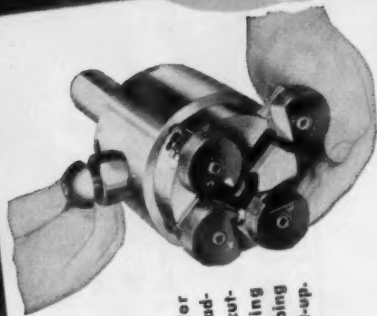
August, 1956

modern machine shop 195



# WITH **VERS-O-TOOL** HEADS

you get PRODUCTION advantages on any job requiring end-forming, turning, thread cutting



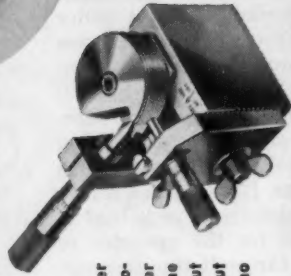
## QUICK, SIMPLE CHANGE-OVER

Vers-o-tools provide for quick removal of threading chasers (or milling cutters) on their holding blocks—without disturbing head adjustment or set-up.



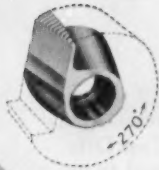
## NO "CUT-AND-TRY" REQUIRED

Take the guess-work out of chaser grinding with the "Namco Vers-o-tool System"; sharpen each chaser on its holding block, then check the grind on Namco micrometer gage; put the set back in the head without need for further adjustment—no "cut-and-try" required.



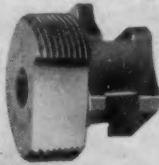
## MANY REGRINDS PER SET

You can grind and regrind 270 usable degrees of Namco chaser circumference—one set cuts more threads than 10 sets of conventional chasers.

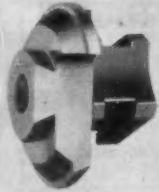


use the same Vers-O-Tool Head . . .

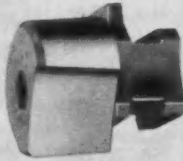
change only cutters and blocks



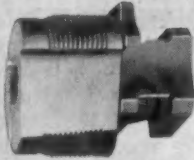
THREADING



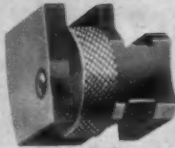
END-FORMING



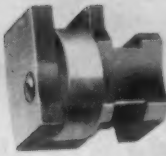
END-TURNING



TURNING-THREADING



KNURLING



BURNISHING

FOR COMPLETE DETAILS SEND FOR BULLETIN DT-52

# National Acme

THE NATIONAL ACME COMPANY • 183 EAST 131ST STREET • CLEVELAND 8, OHIO

SALES OFFICES: • Newark 2, New Jersey • Chicago 6, Illinois • Detroit 27, Michigan

# NOW-All New!

COMPLETE REAMER CATALOG

with the

## WORLD'S GREATEST REAMER SELECTION

by the thousand's



by...  
STYLES  
RANGES  
DIMENSIONS  
QUICK  
SELECTIONS  
STOCK ITEMS  
NET PRICES  
ITEMIZED

### BUY SUPEREAM!

Simplified so you can find the price and size at a glance.

**SUPEREAM REAMERS** are stocked and sold in more sizes than any other reamer in the whole world. (includes decimal)

#### Why Buy Specials?

Why buy reamers from several sources when you can buy them all from stock under one roof. YOU benefit by quick delivery, greater uniformity, simplifies your book-keeping and saves time, money.

**ASK FOR IT—** It will pay you to investigate

**TWENTIETH CENTURY MFG. CO.,** Box 429 M  
Libertyville, Illinois

**GENTLEMEN:** Send us the NEW SELECTIVE  
CATALOG No. 10A.

NAME \_\_\_\_\_

Firm \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ Zone \_\_\_\_\_

State \_\_\_\_\_

**For world's greatest selection of REAMERS!**

For more data circle 353 on Reader Service Card

198 modern machine shop

new shop equipment . . .

### IMPROVED LINE OF TAP DRIVERS

Scully-Jones and Co., 1909 S. Rockwell St., Chicago 8, Ill., has developed a new line of "Safe-Torque" Tap Drivers. This improved driver is said to accommodate a wide range of tap sizes and provide accurate torque adjustment to suit varied operating conditions. The Safe-Torque tap driver offers a number of advantages. It prevents or reduces tap breakage, because a modified overriding clutch completely disengages the tap from the driver. It tends to build up the machine operator's confidence because he need not slow down for blind holes, and there is no noise or impact on release. Higher tapping speeds and increased production are possible with this driver because it operates at any speed taps can take. It will reduce scrap and rework, since the pre-set torque remains constant, giving dependable control under all conditions. "Free wheeling" release action helps to produce uniform, accurate threads.

Use of a properly adjusted Safe-Torque driver is claimed to establish a measure of control over many adverse tapping conditions. If it releases before the hole is completely tapped, that is the danger signal for the operator to check for a dull tap, soft tap, improperly sharpened tap, wrong tap for the job, faulty hole or change in material.

Standard Safe-Torque Tap Drivers are designed for use on any machine with a reversible spindle (except transfer machines, drilling heads and auto-



View of Scully-Jones Safe-Torque Tap Driver

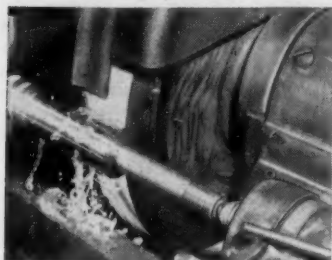
August, 1956

OH! NO ODOR!



## CLEAR·COOL·CLEAN and NO ODOR

A "clean deal" with 3 MOTCH & MERRYWEATHER PRODUCTS

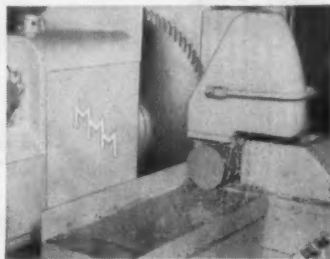


### TRIPLE C GRINDING COOLANT

Transparent solutions; watch work progress. Soluble in water; no emulsifying action. Maximum cooling. Grinding wheels stay clean and free-cutting; minimum wear and dressing. No disposal problem. No slippery work-pieces. No foaming. Non-flammable. No objectionable odor, even in hottest weather.

### TRIPLE C CUTTING COOLANT

Extreme pressure lubricity lengthens tool life. Transparent, water-soluble, non-oily, non-greasy. Non-gumming, non-galling, anti-rust, friction-reducing. Foamless, smokeless, vapor harmless, no skin infection; no fire hazard. Agreeable odor — never foul. A definite aid to production and accuracy.



### Also TRIPLE C MACHINE CLEANER

Dissolves accumulated insolubles in coolant systems; cleans thoroughly at lowest labor costs. All Triple C advantages: Clean, Cool, Clear; safe, preventing bacteria at source. And never a foul odor. Your men will like it!

*A good coolant  
works best in a  
clean machine*



**THE MOTCH & MERRYWEATHER MACHINERY CO.**

Cutting Tool Manufacturing Division

Stocking Dealers in All Principal Industrial Centers  
1250 EAST 222nd STREET, CLEVELAND 17, OHIO

For more data circle 354 on Reader Service Card

## new shop equipment . . .

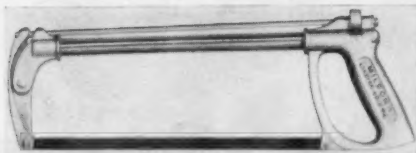
matics with lead screws which require special drivers with compensating springs). Adjustment of torque is extremely simple because every driver is marked with a normal and high torque setting for each tap size. The optimum torque setting for maximum tap life and accuracy depends on a variety of conditions, including material, coolant and finish, and has to be established by actual experience on the job.

For more data circle 79 on Reader Service Card

★ ★ ★

### HACK SAW FRAME DESIGNED FOR USE WITH 12 INCH BLADES

The Henry G. Thompson & Son Co., New Haven, Conn., has announced an improved hack saw frame, designated as the Milford Master Grip No. 4. De-



Milford Master Grip No. 4 Hack Saw Frame

signed for use with 12 inch blades and furnished with a flexible resistor 12 inch 18 tooth blade with easy starting teeth, the Milford Master Grip No. 4 is constructed of light, strong, die-cast aluminum. It has a comfortable handle and front grip which, it is claimed, facilitates correct two-handed sawing. The over-all length of this compact hack saw frame is only 16 inches—less than conventional frames using short-stroke 10 inch blades. It features a storage chamber that makes the right blade (coarse, medium or fine tooth) for each job immediately available.

For more data circle 80 on Reader Service Card

★ ★ ★ ★ ★



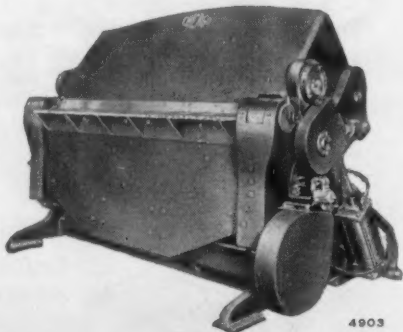
**STEEL HAND and POWER**

## BENDING BRAKES

for Single and Quantity Runs

BENDING STEEL PLATE  
and SHEET METAL

Special Bending Brakes  
Double Folder Brakes



# DREIS & KRUMP

MANUFACTURING COMPANY

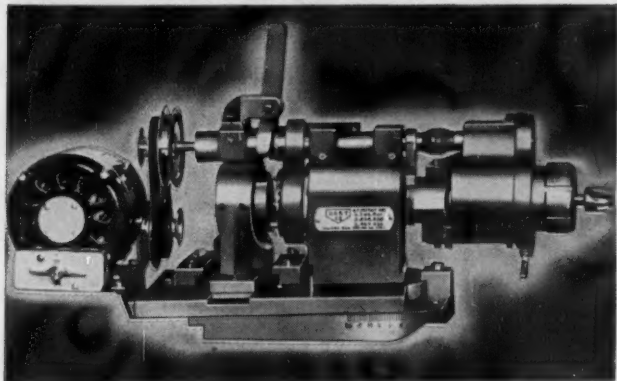
7418 S. Loomis Boulevard, Chicago 36, Illinois

**CHICAGO**  
STEEL BENDING BRAKES  
BOX and PAN BRAKES  
PRESS BRAKES

For more data circle 355 on Reader Service Card



## Precision CIRCULARITY GRINDING ATTACHMENT



Simple, speedy set-ups on this accurate attachment permit fast and easy grinding of form relief, radial relief, form and radial relief together, tapered cylindrical and straight cylindrical. Cutting tool to be produced or reworked is held in collet or between dead centers and revolves on its own axial center. Where full length of spiral cutting tools is to be ground for both form and radial relief, the Circularity Grinding Attachment travel is similar to an O.D. grinder, which insures fine finish, back taper and accurate size.

The Detroit Reamer & Tool Company Model 500 Circularity Grinding Attachment shown above is faster, easier to handle, has positive control, greater adaptability, rugged construction, and is engineered and precision built to provide the finest in precision work. Therefore, it will be of invaluable assistance to anyone whose tooling standards must meet modern production requirements.



*You Can Grind  
Tools Like These*

**on a DETROIT REAMER  
CIRCULARITY GRINDING  
ATTACHMENT**

## Special Cutting Tools of DEPENDABLE QUALITY



The Detroit Reamer & Tool Co. Plant is equipped with the finest in modern machinery and inspection facilities to provide you with the ultimate in precision tools. Our Engineering and production personnel with 35 years of empirical

knowledge behind them are completely qualified to expertly handle your tool needs. For dependable cutting tools—specify Detroit Reamer & Tool Co.

# DETROIT REAMER & TOOL CO.

780 W. MAPLE RD. • P.O. BOX 174 • BIRMINGHAM, MICH.



For more data circle 356 on Reader Service Card

August, 1956

modern machine shop 201



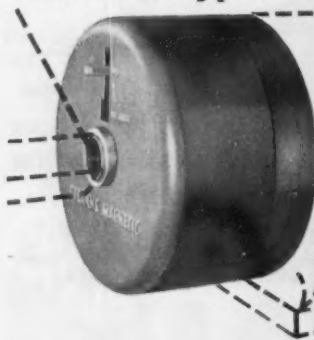
**new shop equipment . . .**

**INSERT CHASER DIE HEAD FOR  
STRAIGHT, REGULAR TAPER OR  
REVERSE TAPER THREADS**

The Eastern Machine Screw Corp., 40-50 Barclay St., New Haven, Conn., has announced another development, namely, an insert chaser die head, for

straight, regular taper or reverse taper threads with only a few minutes change over. It is designated as the Style DMRT H&G Insert Chaser Die Head. This new die head is designed for use on the No. 2 Brown and Sharpe Automatic Screw Machine. It is unique in that it will cut either straight threads, regular taper threads or reverse taper threads by merely selecting the desired type of trip plunger cam.

**new  
solenoid-type**



**through-  
shaft  
magnetic  
disc  
brakes**

New Stearns magnetic disc brake is designed so that motor shaft extends right through and beyond the end of the brake — permits driving off both ends of shaft for wider job application. Also, motor manufacturers can use a standard length shaft for Stearns brakes mounting on NEMA frames 56-C, 66-C, 182 and 184.

Plus all the advantages of Stearns Solenoid-type brakes.

**Fast Stop** — Sets automatically in case of power failure.

**Quick Release** — Instantaneous magnetic pull eliminates drag.

**Easy Maintenance** — Minimum number of parts, quick take-down and reassembly.

**Quick Adjustments** — For torque and lining wear.

See your Stearns representative or write us.

1142

**MAGNETIC EQUIPMENT FOR ALL INDUSTRY**

**STEARNS**



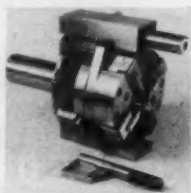
**MAGNETS**

STEARNS MAGNETIC INC., 664 S. 28th St., Milwaukee 46, Wis.

For more data circle 357 on Reader Service Card

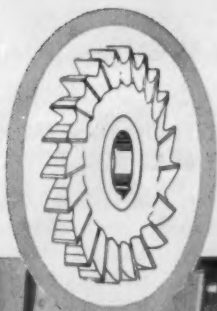
The die head is so designed that on cutting straight threads the carriers are held in a constant position. On cutting regular taper threads, the carriers are cammed for a receding action. On cutting reverse taper threads, the carriers are cammed for a closing in action. The carriers and chasers are the same as those used in the Series 1101 die heads, and the adjustment for size has been made convenient by a notched adjusting ring.

For more data circle 81 on Reader Service Card



**H&G DMRT Insert  
Chaser Die Head**

# Work in comfort with SENTRY FURNACES



When you heat treat high speed steels, you don't have to "heat-treat" your workers too. A national survey has shown manufacturers' dissatisfaction with furnace equipment that causes uncomfortable working conditions by radiating excessive heat and producing objectionable fumes. Sentry Furnaces, with their enclosed Diamond Block Method of atmosphere Control, reduce heat radia-

tion and eliminate undesirable gasses and vapors, thus greatly improving working conditions around the furnace. Heat treating high speed steel tools, such as the milling cutter shown above, is typical of the fine work required from Sentry Furnaces.

Give your workers more efficient shop conditions, get a superlative product — specify Sentry.



Request  
Catalog  
S-17

Write →

## Sentry TRADEMARK ELECTRIC FURNACES



THE SENTRY CO. • FOXBORO • MASS.

For more data circle 358 on Reader Service Card

**new shop equipment . . .**

## **CONTROLLED ATMOSPHERE FURNACE FOR TOOL STEELS**

A new and larger model of a fully automatic, controlled atmosphere tool-room furnace has been announced by Cooley Electric Manufacturing Corp., Dept. F-2, 35 S. Shelby St., Indianapolis,

Ind. This furnace is designed for the general hardening of tool steels and, according to the manufacturer, steel hardened in this controlled atmosphere equipment is clean and free from decarburization.

The new Model GA-4 is fully automatic as to furnace controls, generator and temperature controls, as well as to the gas curtain operation. Chamber dimensions are 10 x 8 inches, and the power input is 8 KW at 230 volts, single or 3 phase, for operation to 2,000 degrees Fahrenheit.

The atmosphere system consists of a cracking unit to which is fed, by means of a variable speed pump, a mixture of alcohol and water proportioned to the type of treatment desired. This mixture is cracked into gas of a controlled analysis to maintain the correct

# MEASURING & CHECKING EQUIPMENT

*Tailored to your job*



**HEIGHT BLOCKS**  
aluminum body,  
hardened steel  
top and bottom



**ANGLE PLATES**



**ADJUSTABLE ANGLE PLATES**  
and  
**LAYOUT ANGLE PLATES**



**ANGLES**  
in 39 sizes



**BOX  
PARALLELS**  
in 18 sizes



**SURFACE PLATES**  
over 50 sizes

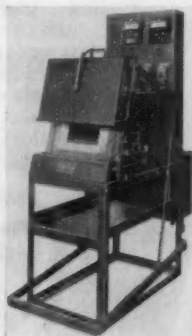


**UNIVERSAL  
ANGLES**  
in 10  
sizes

**Write for Catalog today**

## MACHINE PRODUCTS CORP.

**6771 EAST McNICHOLS ROAD  
DEPT. F, DETROIT 12, MICHIGAN**

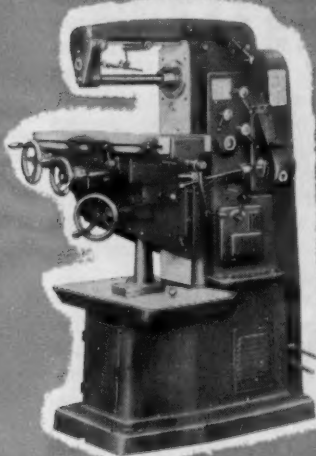


**Cooley Model GA-4  
Toolroom Furnace**

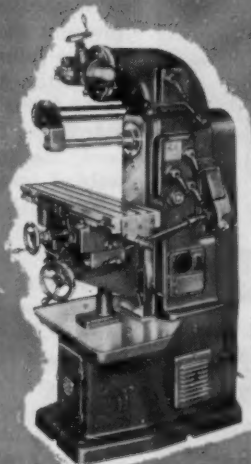
For more data circle 359 on Reader Service Card

# OUTSTANDING NEW MACHINERY AT LOWER COST! LIBERAL TERMS RENTAL PLANS

## PEDERSEN MILLING MACHINES



**VPF-00 \$1295.00**



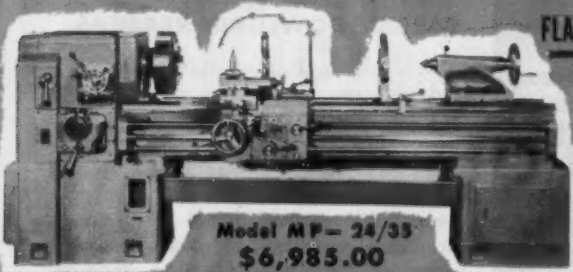
**VPV-00 \$1895.00**



**PEDERSEN UNIVERSAL TOOL & CUTTER GRINDER, MODEL U.S.L.**

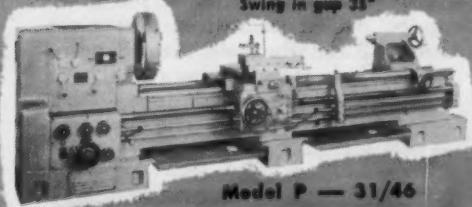
Main spindle rated at 3,800 to 5,750 RPM.  
3 1/2" x 5 1/2" table working surface.

**\$2,395**



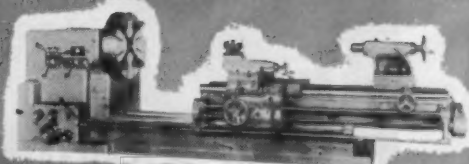
**Model MP-24/35  
\$6,985.00**

Swing over ways 24";  
Swing in gap 35"



**Model P-31/46  
\$8,090.00**

Swing over ways 31";  
Swing in gap 46"



**Model PS-34/61  
\$10,390.**

Swing over ways 34";  
Swing in gap 61"

**Sliding Bed  
Gap Lathe**

**FLAME HARDENED AND GROUND BED WAYS**

## IMPERIAL LATHES

Precision spindles are hardened & ground, machined from chrome-nickel steel forgings. All gears and shafts are hardened and ground. Spindle noses are standard taper key-drive type.

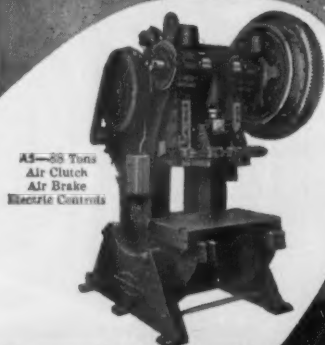
# AARON MACHINERY CO., INC.

Dept. M 45 CROSBY ST. NEW YORK 12, N.Y. WA 5-8300

Branches at:  
Buffalo N.Y. Mineola N.Y.

**Backed by nearly  
a half century of  
dependable performance**

**... yet modern to the minute  
for today's exacting demands.**



**A3—55 Tons  
Air Clutch  
Air Brake  
Electric Controls**

- Engages smoothly; no sledge hammer blow.
- Inched, single stroke, or continuous.
- Less heat as brake is released when clutch is engaged.
- Less current used; brake is off when clutch is engaged.
- Clutch torque output in direct ratio to applied air pressure and controlled by regulator valve.
- Two run buttons, one stop button, one inch button operate on 110 volt regardless of motor current (220 or 440).
- No back lash when using air cushion or heavy spring pressure pads.
- Clutch is reversible. (By reversing wires on motor you can inch out of stall).

Robinson Presses are available (in either pin type or air clutch models) in sizes from 32 to 88 Ton.

**ROBINSON  
PRESSES**

**NEW ALBANY MACHINE MFG. CO.  
NEW ALBANY, INDIANA**

*Write for illustrated  
brochure and  
specification sheet.*

For more data circle 361 on Reader Service Card

**206 modern machine shop**

## **new shop equipment . . .**

carbon potential for equilibrium with the steel being treated. Operation is economical, and the system is so simple and automatic that the directions can be followed by any capable operator, without the necessity of having an engineer or other technical expert constantly on the job. To insure a perfect seal, the furnace is equipped with a welded inconel retort, which is claimed to prevent the heating elements from being exposed to the effect of the atmosphere gases. The gases are confined to the retort chamber.

The manufacturer claims that the outstanding characteristics of this furnace are relatively low cost for small furnaces, control simplicity and constant gas analysis, which allows operation with little attention from operator. For more data circle 82 on Reader Service Card

★ ★ ★

## **CARBIDE DOWEL PIN REAMERS**

Whitman & Barnes, 40050 Plymouth Rd., Plymouth, Mich., now offer a complete selection of sizes in carbide dowel pin reamers. Designed specifically for reaming operations in die hardened steel from 45 to 65 C Rockwell, W&B carbide dowel pin reamers are said to eliminate the need for grinding, lapping or honing. According to the company, dowel pin holes can be drilled undersized, the piece hardened and the hole reamed accurately to size. Reamers are available in 1/4, 5/16, 3/8, 1/2, 5/8 and 3/4 inch diameters and in sets.

For more data circle 83 on Reader Service Card

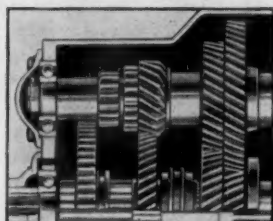


**View of W & B Carbide Dowel Pin Reamer**

**August, 1956**



# GREATER



Macco 472 at both ends positively eliminates the major complaint against using soluble coolants in automatics—the leakage of lubricating oil into coolant sump, and vice versa, causing rust in gear boxes.

# AUTOMATIC



# PRODUCTION

*to use*  
**MACCO 472**  
*at both ends of your*  
**AUTOMATICS**



For years, leading manufacturers everywhere have been using Macco 472 emulsified oil as both a gear box lubricant and a cutting coolant. Almost without exception, they report sharply increased production and reduced costs.

You, too, will enjoy important benefits by using Macco 472 at both ends: Longer tool life—Increased spindle speeds and cutting feeds—Cooler operation—Inspection of parts without cleaning—Elimination of chip spinning and oil salvage—Up to 90% reduction in cleaning costs—Reduction of fire hazards and lower insurance premiums—General good house-keeping and a cleaner and more satisfied personnel.

Only a soluble cutting lubricant with the characteristics of Macco 472 should be so used. A minimum of 4000 lbs. per square inch of film strength at a 15 to 1 emulsion, with very little detergency, is required and the emulsion must be stable in every respect.

Macco 472 enables you to grind tools without the sharply defined chip breakers required with oils, due to the elimination of the hot or plastic chip. With the proper amount of coolant, the chip becomes brittle and breaks more easily, assuring longer tool wear. Cratering and breakage are minimized.

•  
**For rust-proofing,  
investigate  
Macco Blucoat or  
Macco Anti-Rust**  
•

*To work out this problem, write us  
or call a Macco Sales Engineer.*

**MACCO**  
**PRODUCTS COMPANY**

CHEMICAL COMPOUNDS

FOR THE METAL WORKING TRADE—SINCE 1931

9210 SOUTH SANGAMON STREET • CHICAGO 20, ILL.

For more data circle 362 on Reader Service Card

August, 1956

modern machine shop 207



**new shop equipment . . .**

## **MODERNIZED FOLDERS AND BRAKES**

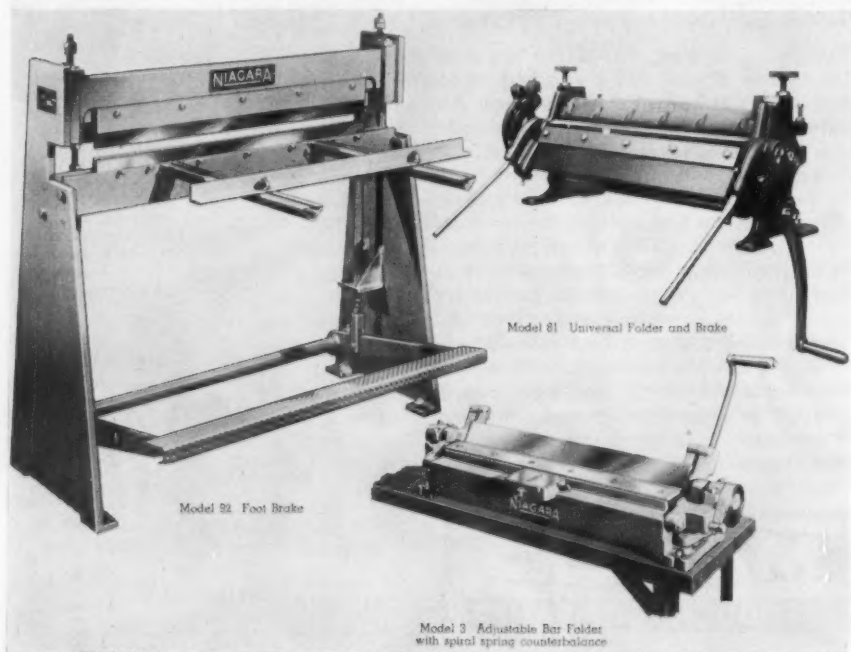
Modernized lines of folders and brakes are now available from the manufacturer, Niagara Machine & Tool Works, Buffalo 11, N. Y., in several models to meet a wide range of sheetmetal folding requirements.

The adjustable bar folders, for making accurate folds of limited widths along the edge of the sheet, embody such features as clamping and folding with one motion of handle; adjustable gage and jaw for accommodating different width folds and various thicknesses of material, respectively; and self-contained spiral spring counterbalance requiring no extra bench space.

The machines are available with working lengths of 21 thru 42 inches. There are four hand operated models and three air actuated.

A foot brake, with a 36 inch working length, produces bends any distance from the edge of the sheet. Its gage, for locating the bend, can be attached to either the front or rear of the machine. Adjustable stops, conveniently located on the slide, regulate the angle of the bend. An air actuated model is also available.

Ideal for a variety of folding operations, Niagara Universal Folders and Brakes are claimed to produce accurate, uniform folds of any width. They are equipped with a front gage for narrow folds and a back gage for wide folds. An adjustable clamping bar accommodates special or slotted clamping blades up to 2 inches thick. The



**Illustration showing three different models of Niagara modernized folders and brakes**

# Abrasive Cutting

*the best way to cut many materials  
the only way to cut some*

## Allison Cut-Off Wheels

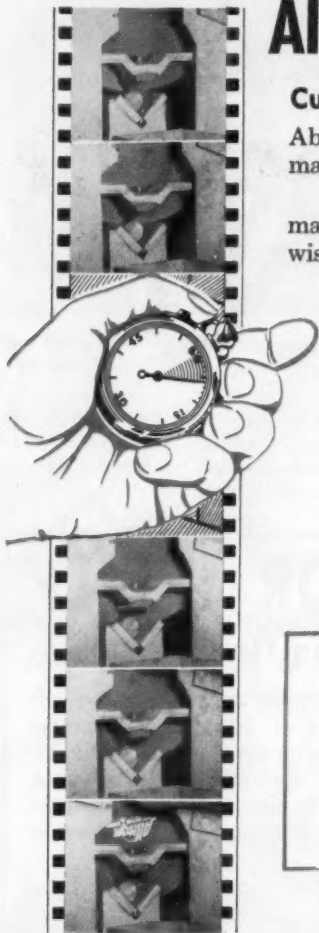
### Cut 1 1/4" Bar Stock in 6 seconds

Abrasive wheel cutting is faster than sawing. In many cases it is ten to twenty times as fast.

An abrasive wheel will cut the hardest materials with ease. No need to anneal or otherwise prepare material for cutting.

A properly selected abrasive wheel leaves a finish which requires little, if any, "cleaning up" operations.

At the left an ALLISON Abrasive Cutting Wheel is shown cutting 1 1/4" bar stock in 6 seconds per cut.



**Allison**  
ABRASIVE CUTTING WHEELS

### It pays to consult a specialist...

Profitable abrasive cutting means the right abrasive wheel...and the proper abrasive cut-off machine...for the specific job. Why not let an ALLISON abrasive cutting specialist check your hardest cutting job?

Send for Booklet  
"ABRASIVE CUTTING"  
today



**ACCO**



## ALLISON DIVISION AMERICAN CHAIN & CABLE

254-D Island Brook Avenue, Bridgeport 8, Conn.

For more data circle 363 on Reader Service Card

August, 1956

modern machine shop 209

**new shop equipment . . .**

folding bar is adjustable for sharp folds or rounded bends. Two adjustable stops produce any angle of bend. There are two models with 30 and 42 inch working lengths.

For more data circle 84 on Reader Service Card

★ ★ ★

**METALLIZING GUN SPRAYS  
STAINLESS STEEL, BRONZE  
AND HARD-FACING ALLOYS**

An entirely new type of metallizing gun has been developed which permits the spraying of stainless steel and bronze, as well as hard-facing materials and ceramics in powder form, without requiring compressed air. Only a tank of oxygen, one of gas and a few accessories are required. With the new equipment a wide range of metallizing



*View of worker hard-facing a worn pump rod with the new Metco Type P ThermoSpray Gun*

work can be done—built-up with harder and longer-wearing, corrosion-resistant, stainless steel or bronze. Worn pump plungers, motor shafts and many



## **PAYS FOR ITSELF**

### ***Time and Time Again***

Wardwell's 57 T, Circular Saw Grinder, will sharpen as many as 250 Milling Cutters, Slitting and Screw Slitting Saws .015" thick at one time with a variation, plus or minus .001" of exact diameter for entire lot. Automatically indexes the gang of saws, one row of teeth at a time.

Steady, accurate, durable.  
Grind either wet or dry. A time  
and money saver.

*Ask for Bulletin describing 57 T*



**WARDWELL**

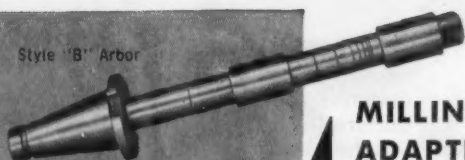
**MANUFACTURING CO.**

3303 Ridge Rd., Cleveland 9, O.

**Maker of Largest Line of Saw and Tool Sharpening Machines**

For more data circle 364 on Reader Service Card

Style "B" Arbor



Style "C" Arbor



Cutter Adapter  
for End Mills



Adapter for  
Taper Shank Tools



## MILLING MACHINE ARBORS, ADAPTERS, ARBOR SPACERS AND BEARINGS

*Hardened and ground to high standards of accuracy and quality.*

These products are built by long established, reputable West German manufacturers, and tested for performance to American standards. Immediate delivery from New York City stock at low competitive prices.

Also available:

- Multi purpose vises
- Tapping attachments
- Lathe mandrels
- "Wille-Grip" keyless drill chucks
- Large variety of machine tools



## QUICK CHANGE CHUCKS & COLLETS

*All parts hardened and ground. Simplicity of construction insures trouble-free operation.*



Our headquarters in New York City

Write for complete details and prices to Dept. 303

**M.B.I. EXPORT & IMPORT LTD.**

A Division of Machinery Builders Inc.

**475 Grand Concourse, Bronx 51, N. Y.**

"Over 20 years experience in designing and building machinery"

CABLE ADDRESS: Machbuild New York

Phone: MOtt Haven 5-0900



Quick Change  
Chuck

Quick Change  
Collet

For more data circle 365 on Reader Service Card

## **new shop equipment . . .**

other types of machine parts can be built up and, with the self-fluxing, hard-facing alloys available, hard-surfacing operations can be carried on by smaller shops without compressed air.

The Metco Type P ThermoSpray Gun and the special powdered metals for use with it have been developed by Metallizing Engineering Co., Inc., 1111 Prospect Ave., Westbury, L. I., New York.

For more data circle 85 on Reader Service Card

★ ★ ★

## **BENCH MODEL MARKING MACHINE**

The Noble & Westbrook Manufacturing Co., 25 Westbrook St., East Hartford, Conn., has announced the first of a new line of bench model roll

marking machines. Identified as the Series No. 7, these machines have been designed to fill the need for a small universal bench type marking machine for the permanent marking of either round or flat workpieces, which do not require the pressure or size capacity of heavier type floor model marking machines.

The Model No. 420, the first of the Series No. 7 to be introduced, features a hand operated work slide and a rigid die holder head, which is mounted and is vertically adjustable on a round column. Adjustment of the die holder head makes it possible to vary the gap for large or small workpieces. The die holder slide is also adjustable for setting depth of mark and for any adjustment necessary for small changes in work diameters. Thus, it is not necessary to adjust the die holder head on the post except for extreme changes in diameter. The die slide features a

## **WHY WASTE YOUR PROFITS ON MAKESHIFT SETUPS?**



**BE WISE**  
*Save with*  
**NORTHWESTERN**



**T-NUT & STUD SETS—12 SIZES**

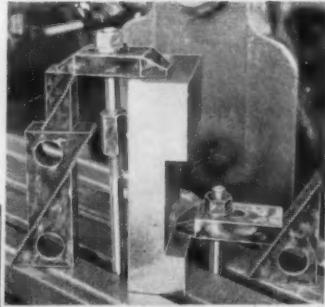
**PUNCH PRESS SETS—5 SIZES**

**STEP BLOCK & CLAMP SETS—5 SIZES**

**CATALOG No. 23 SENT ON REQUEST**

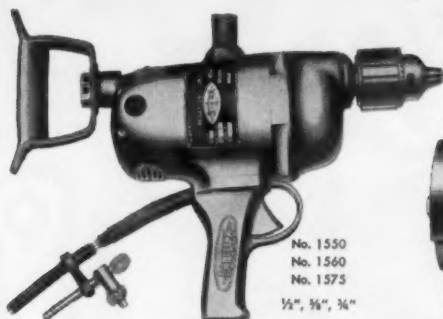
*Northwestern*

**119 HOLLIER AVE., DAYTON 3, OHIO**



For more data circle 366 on Reader Service Card

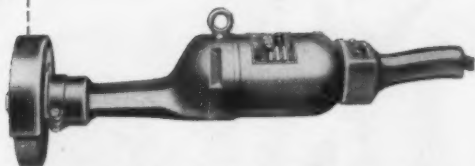




No. 1550  
No. 1560  
No. 1575  
 $\frac{1}{8}$ "  $\frac{1}{4}$ "  $\frac{3}{8}$ "

## ELECTRIC DRILLS

Advanced Design  
Balanced Power  
Rugged Construction  
A Size for Every Need  
Sioux Dependability  
No Drill is Built to  
Last Longer



## PORTABLE GRINDERS

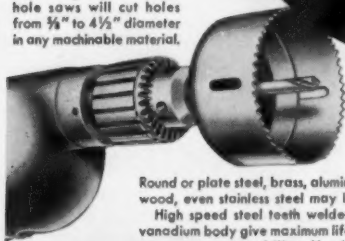
A Dependable, Heavy Duty Tool for  
Grinding, Buffing, Wire Brushing.  
5" and 6" Wheel Diameters.  
Carefully Balanced for Easy  
Handling.

Sioux Quality Throughout



## HIGH SPEED HOLE SAWS

Sioux high speed teeth  
hole saws will cut holes  
from  $\frac{1}{4}$ " to  $4\frac{1}{2}$ " diameter  
in any machinable material.



Round or plate steel, brass, aluminum, bronze,  
wood, even stainless steel may be cut.

High speed steel teeth welded to chrome  
vanadium body give maximum life and cutting  
ability. Used in electric  
drills, drill press, or lathe.

## WIRE WHEEL BRUSHES



Durably built of special  
brushing wire with wide  
face, even trim, perfect  
balance. Designed for heavy duty cleaning,  
removing, deburring, descaling, roughing,  
buffing, and polishing.

Torque or saucer shaped brushes are fast  
workers for body repair, removing paint,  
scale or corrosion, cleaning welded joints, etc.  
Used with Sioux flexible shafts or portable  
tools the broad brushing area cleans large  
areas in less time.



**USE SIoux ALL THE WAY THROUGH**

SOLD ONLY THROUGH  
AUTHORIZED DISTRIBUTORS

**ALBERTSON and CO., INC.**

SIoux CITY, IOWA, U.S.A.

ELECTRIC DRILLS, IMPACT WRENCHES,  
SANDERS, POLISHERS, BENCH GRIND-  
ERS, PORTABLE GRINDERS, HAND SAWS,  
FLEXIBLE SHAFTS, ABRASIVE DISCS.

For more data circle 367 on Reader Service Card



HOW  
**VIMCO** *Lights*  
 instant adjustability  
 saves you money!

Note how easily Vimcolights can be moved to any position in the picture above. On your machine this means the operator can instantly adjust the Vimcolight to meet the needs of his work. There's no screw or bolts to loosen, then reset . . . Vimcolight's rigid steel wrapped flexible arm and wide range lamp swivel are ready to move instantly . . . yet stay firmly in place when set. The operator has soft, comfortable light that helps him work better . . . more efficiently . . . all shift long.

Send for "Bulletin 85"  
 or "DEM Bulletin"

VIMCOLIGHTS Are UL Listed



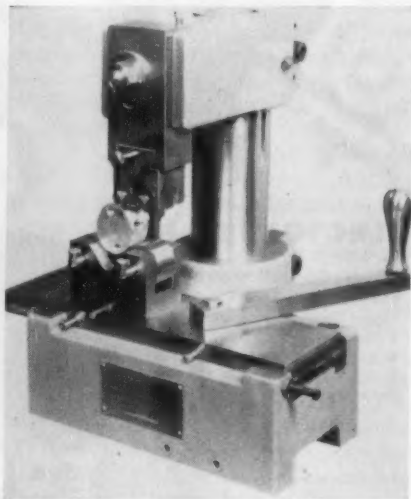
**VIMCO MFG. CO., INC.**  
 Since 1919

111 Brayton St. Buffalo, N. Y.

For more data circle 368 on Reader Service Card

214 modern machine shop

new shop equipment . . .



Noblewest Bench Model Roll Marking Machine

standard Noblewest dovetail slot to accommodate standard holders. Holders with the dovetail shank can be readily adjusted for position of mark and easily removed for change in die setup.

Tooling illustrated includes a roller cradle fixture, which supports the piece part and permits rotation during marking. The dovetail shank die holder is shown with a solid marking die. Similar holders are available to accommodate individual type of various character sizes. A second model with air-operated head will be introduced shortly. For more data circle 86 on Reader Service Card

★ ★ ★

**EIGHT-SPINDLE ADJUSTABLE  
 MULTIPLE HEAD FEATURES  
 FLEXIBLE SHAFT SPINDLES**

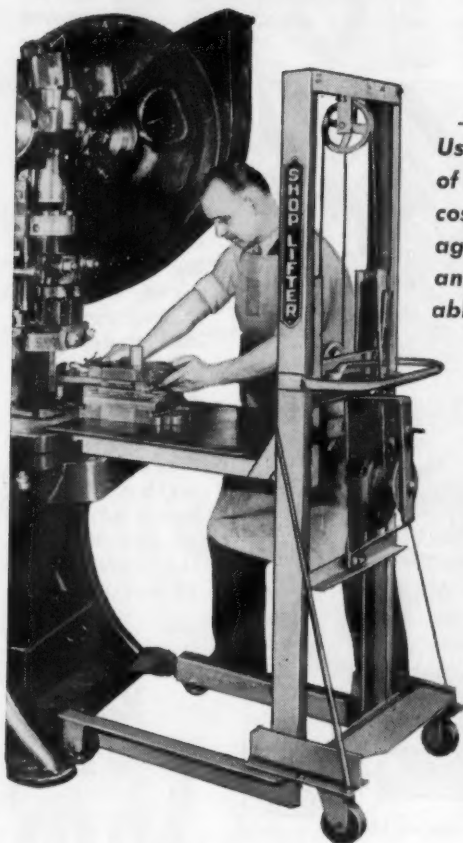
The Ettco-Emrick Model 800 flexible shaft driven adjustable spindle multiple head, announced by Ettco Tool Co.,

August, 1956

# How would one man alone handle a 500 lb. die without a **SHOPLIFTER**



*Use the SHOPLIFTER to avoid risk of painful accidents and to protect costly dies. Transport dies from storage area to press. To move dies in and out of press. Use it as an adjustable height bench for working on dies.*



*Order today  
performance guaranteed  
Specify 10 day free trial on your order*

Platform lift 4'-6", high enough for all press beds, yet overall height will clear any standard doorway.

Width 24". Moves easily between machines — in confined areas.

Spur gear hoist unit — most efficient hoist mechanism — lifts capacity load with only 20# crank pressure.

Friction disc clutch holds load securely — automatically.

Big safety factor for occasional overloading when necessary.

Dependable. Trouble free service for years. Low first cost combined with little or no maintenance cost.

Simplicity of design. Any mechanic can disassemble and replace worn parts when necessary.

## **Three capacities to choose from**

Type D (illustrated)	500 lbs. capacity .....	\$197.00
Type DX — 1000 lbs. capacity....		365.00
Type DX — 2000 lbs. capacity....		430.00
	f.o.b. Chicago	

**ECONOMY ENGINEERING CO., 4507 W. Lake St., Chicago 24, Illinois**

Eastern sales office, 342 Madison Ave., New York 17, N.Y.

For more data circle 369 on Reader Service Card

## new shop equipment . . .

Inc., 598 Johnson Ave., Brooklyn 37, N. Y., is said to be an extremely lightweight and compact unit designed for both tapping and drilling up to eight holes on any tapping or drilling machine. Its design, featuring the use of flexible shaft drives for the spindles, permits a wide range of hole patterns

with a small drive to spindle distance than conventional geared or universal joint spindle adjustable heads. The flexible shafts have been developed specifically for tapping and drilling, and are said to operate at high speeds without any vibration or the danger of unraveling.

Accurate positioning of the spindles is accomplished by means of spindle adjusting arms, which can be moved

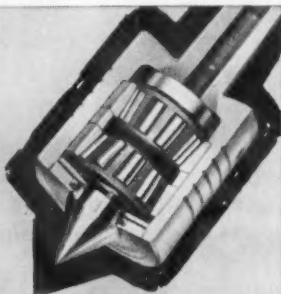
in and out or transversely even while the unit is operating. Jig-bored templates can be supplied in place of the adjusting arms where a fixed-center set-up is desired. Individual shafts, spindles and adjusting arms are removable as integral units when fewer than eight spindles are used.

One of the basic advantages of the head is its versatility. It not only of-

### **PRECISION BEARINGS**

## put long life in

## **IDEAL LIVE CENTERS**



SEE  
YOUR  
DISTRIBUTOR  
OR MAIL  
COUPON

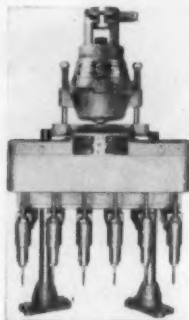
Specify IDEAL Live Centers and get custom-engineered performance from standard models. Your IDEAL distributor stocks them in a wide range of models and tapers. IDEAL Live Centers are guaranteed to match the accuracy and capacity of your lathe!

**IDEAL**

IDEAL INDUSTRIES, Inc. • 1031 Park Ave., Sycamore, Illinois

Kindly send us	Name.....
data on Ideal's	Company.....
complete line of	Address.....
LIVE CENTERS.	City.....Zone.....State.....

For more data circle 370 on Reader Service Card



**Ettco-Emrick Model  
800 Multiple Head**



**best on every point**  
*... and among high speed steels*  
**the top performer is REX**

To leap the hurdle of competition, a product needs performance born of quality. And Crucible's REX® high speed steel has it — in accurate size... sound uniform structure... dependable response to heat treatment... optimum tool performance.

Now, thanks to improved manufacturing techniques, REX is even better—more uniform. Put it to work on your next job, and you'll quickly know why REX is today, as it has always been—the *standard by which all other high speed steels are compared.*

Call for REX at your local Crucible warehouse. Or order it directly for prompt mill delivery. And for a list of available data on REX and other Crucible *special steels*, write now for a free copy of the "Crucible Publication Catalog." Crucible Steel Company of America, The Oliver Building, Mellon Square, Pittsburgh 22, Pa.

**CRUCIBLE**

first name in special purpose steels

**Crucible Steel Company of America**

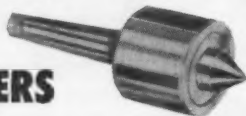
Canadian Distributor—Railway & Power Engineering Corp., Ltd.

For more data circle 371 on Reader Service Card



**MANHATTAN'S MIRACLES!  
TOP VALUE — LOWEST PRICE**

**HEAVY DUTY  
LIVE  
CENTERS**



- #2 Morse Taper \$15.00
- #3 Morse Taper \$18.00
- #4 Morse Taper \$25.00

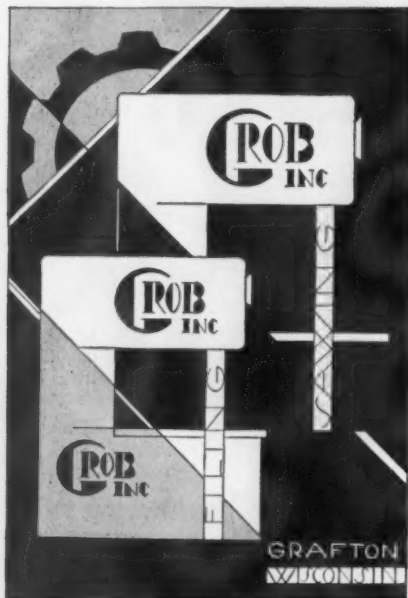
**SAVE  
40%**

Hardened and ground • Sealed roller ball bearings • Accurate free-turning point  
Precision made in Western Germany

*For tremendous savings, write for circular listing sensational bargains.*

**MANHATTAN SUPPLY COMPANY**  
The Cutting Tool Discount House  
151-A GRAND ST., NEW YORK 13, N. Y.  
Telephone: CAnal 6-4992

For more data circle 372 on Reader Service Card



For more data circle 373 on Reader Service Card

**new shop equipment . . .**

fers a wide range of adjustment, but can be used horizontally or vertically for both tapping and drilling. Conversion from drilling to tapping merely requires the addition of a standard tapping face plate and the replacement of drill collets with interchangeable floating tap collets. A 1:1 drive ratio permits the unit to be used for lead screw tapping. Other design features of the unit include one-piece hardened and ground grease-lubricated gears in the driving head; grooved precision-type ball bearing thrusts for each spindle; hardened and ground guide rods running in bronze bushings in the aluminum alloy head for extra rigidity.

Capacities of the unit range to 5/16 inch drills and taps in aluminum. Maximum bolt circle is 8.812 inches. Minimum center distance between spindles is 5/8 inch.

For more data circle 87 on Reader Service Card

★ ★ ★

**NEW TECHNIQUE FOR  
PRINTED CIRCUIT DRILLING**

A considerable speed-up in the drilling of printed circuit plates is now made possible by a newly developed pneumatic attachment, announced by New Hermes Engraving Machine Corp., 13-19 University Pl., New York 3, N. Y. The manufacturer points out that the rapid drilling of printed circuit plates has always represented quite a production problem. In most cases, a small drill press is used and the plates are moved for individual drilling of each hole, a rather slow process, averaging 20 to 30 holes per minute.

New Hermes has announced the development of a pantograph machine with adjustable ratio setting and pneumatic attachment, which is said to en-

## Spin your **RIVETS**

**faster and more  
economically  
on the NOISELESS  
LINLEY  
RIVETER**



Rivet spinning on the Linley is a sure way to cut production costs. With Linley equipment, you can easily produce finely finished rivets even in close places. Send us samples of the work you want riveted, and without obligation we'll show you how it can be done the Linley-way and what it will cost.

Machines available for handling iron and cold rolled steel rivets up to 3/4" and larger size rivets in softer materials.

Send for Bulletin R today.

**LINLEY BROTHERS CO.**

Also builders of JIG BORERS

671 State St. Ext., Bridgeport 1, Conn.

For more data circle 374 on Reader Service Card



## STANDARD STEEL SPECIALTIES

### • MACHINE KEYS

We can supply a complete line of finished machine keys including gib head and taper keys, rod keys, round and keys, etc.

### • WOODRUFF KEYS

Complete stock of standard keys on hand for prompt shipment. Made from open hearth or alloy steel.

### • TAPER PINS

Available in sizes 7/10 through 10 and lengths from 3/4 inch to 6 inches. Others made to specifications.

### • MACHINE RACK

Can furnish rack from almost any size blank and pitch as well as length to form continuous sections.

Write for catalog

**STANDARD STEEL SPECIALTY CO.**

BEAVER FALLS

PENNSYLVANIA

Plants: Beaver Falls, Pa.; Hammond, Ind.

For more data circle 375 on Reader Service Card

August, 1956

**LIVE CENTER  
ACTION WITH  
DEAD CENTER  
ACCURACY**

USE



**ANTI-SCORING  
LUBRICANTS**



**PROVE IT TO  
YOURSELF IN  
YOUR OWN PLANT FOR ONE  
DOLLAR AND THIS COUPON!**

Free-running on dead centers—with COMPLETE protection. CMD Lubricants are CONCENTRATED, form a "tough" film—absolutely NO GALLING or SEIZING—under the heaviest load. STABILIZED for added "oiliness" giving longer, smoother runs without slip-stick action. It all adds up to LIVE CENTER ACTION with DEAD CENTER PRECISION. The bigger the job, the better you'll like it.

**TRIAL ORDER—  
TWO FOUR OZ. TUBES \$1.00**

Send me my order of CMD right away!

Bill me ☐ Bill my company ☐

Name

Company Name

Address

City  State

Chicago Manufacturing and Distributing Co.  
1910 West 46th St., Chicago 9, Illinois

**CHICAGO MANUFACTURING  
AND DISTRIBUTING CO.**

For more data circle 376 on Reader Service Card

modern machine shop 219

## new shop equipment . . .

able an unskilled operator to increase the drilling operation to more than 100 holes per minute. This high output is made possible by a tracer-guided method with an air-actuated feed.

A master template, from which the drill pattern is reproduced, shows a number of dots representing the

amount of holes to be drilled. The dots are connected with grooved lines so that the operator can quickly glide the tracing stylus of the pantograph from dot to dot. A heavy duty ball-bearing spindle, operating at a speed up to 15,000 r.p.m., is air-actuated for up and down movement.

The pneumatic attachment, which controls the feed, is easily adjustable. The release is caused by a sen-

sitive solenoid unit which can be operated by either hand, knee or foot. An automatic release is achieved when the tracing stylus is placed in the dot of the master template.

The great advantage of tracer-guided drilling lies not only in the speed of the operation, but also in the accuracy obtained. The multi-ratio pantograph is adjustable and allows the use of an enlarged master template laid out in any ratio, ranging from 1:2 up to 1:12. Any slight error in the template is reduced on the finished product in relation to the ratio used.

Many printed circuit plates require holes in different sizes and here, the

	<b>WHEREVER</b>
	<b>SPINDLES</b>
	<b>ARE</b>
	<b>NEEDED,</b>
	<b>STANDARD</b>
	<b>SUPPLIES</b>
	<b>THE</b>
	<b>FINEST!</b>
<p>SINCE 1912</p>  <p>BALLMARK OF THROUGHOUT THE WORLD</p>	<p>the <b>STANDARD</b> electrical tool co.</p> <p>2487 River Road, Cincinnati 4, Ohio</p> <p><b>BOOTH 1047 • METAL SHOW CLEVELAND • OCTOBER 8 - 12</b></p>

For more data circle 377 on Reader Service Card

# ULTRA-CHEX GAGE BLOCKS

*for Every  
Need!*



**82 Block Set**  
**\$303.00** Complete

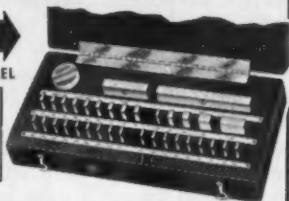
*This Set will supply the needs of any discriminating shop that must work to gage-block precision.*

Supplied in one  
Superior Accuracy

**5 MILLIONTHS ± ACCURACY**

**34 Block Set**  
**\$132.50**  
WITHOUT OPTICAL PARALLEL

**QUICK  
DELIVERY  
ON ALL SETS**



**9 Block Set**  
**\$24.75**  
OPTICAL  
PARALLEL **\$6.00**

All Sets at "Money Saving  
Prices" due to Mass Produc-  
tion Methods.

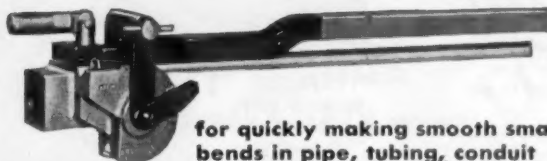
**GEORGE SCHERR CO., Inc.**

WRITE FOR FULLY ILLUSTRATED CATALOG -- Code GIPFY

200-MM LAFAYETTE ST. • NEW YORK 12, N.Y.

For more data circle 378 on Reader Service Card

## GREENLEE HAND BENDER

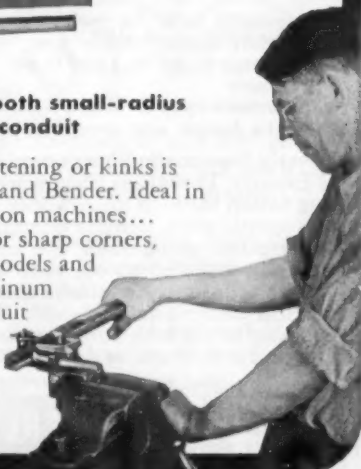


**for quickly making smooth small-radius  
bends in pipe, tubing, conduit**

Forming small-radius bends without flattening or kinks is simple, speedy work with a GREENLEE Hand Bender. Ideal in the shop for pipe and tubing installations on machines... especially designed to form neat bends for sharp corners, nooks and other close quarters. Various models and sizes for steel, copper, brass and aluminum tubing or pipe, rigid and thin-wall conduit



GET FREE FOLDER E-207 AND  
BOOKLET E-201. Complete  
facts and prices on the Greenlee  
Bender line. Write Greenlee  
Tool Company, c/o Herbert  
Avenue, Rockford, Illinois.

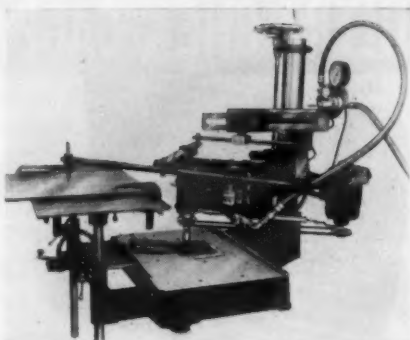


For more data circle 379 on Reader Service Card

## new shop equipment . . .

manufacturer states, is where pantographic drilling shows a further important advantage. Instead of changing drills for different size holes, a complete printed circuit plate can be drilled pantographically in one operation without changing tools. In addition to marking the master templates with dots representing the smallest hole, a number of circles are engraved which are then traced for cutting the larger holes. A routing cutter with parallel edges drills the smallest hole and routes the larger ones. This is done by tracing the various sized engraved circles on the template.

The pantograph machine can be put to many uses other than drilling. It is an efficient engraving machine for



New Hermes Pantograph Machine with Adjustable Ratio Setting and Air Attachment

marking panels and parts, calibrating dials or profiling plastics and metals and other specialized operations.

For more data circle 88 on Reader Service Card



## *Pneumatic* **THROATLESS SHEAR**

**FASTER, EASIER CUTTING**  
*to any Shape!*

- Compactly built for maximum visibility and efficiency
- Operates on 35 to 150 PSI air pressure
- Adjustable power and return stroke length and speed

Beverly Pneumatic Shears combine all the advantages of Beverly Throatless Shears with fast, effortless cutting action through air cylinder operation. Air operation speeds work, permits accurate cutting to a pattern or template, as operator can concentrate on guiding work through the shear. Flow control valves permit precise adjustment of stroke speed; adjustable actuating arm controls stroke length. Foot Switch permits operator to use both hands on the work piece. Operates on 110V. 60 cycles AC and 35 to 150 PSI air pressure.

See your nearby Beverly Distributor

Write for catalog  
sheet and  
complete details.



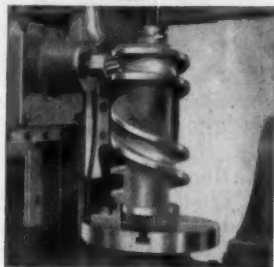
**CAPACITY**  
 $\frac{3}{16}$  MILD STEEL  
10 GA.  
STAINLESS

**BEVERLY SHEAR MANUFACTURING CO.**  
3000 W. 111th STREET • CHICAGO 43, ILLINOIS

For more data circle 380 on Reader Service Card



## Rowbottom for Cams



Two revolution Index Cam

**"KNOWHOW" . . . to save time and money**  
Every phase of cam-making . . . from design through production is offered by Rowbottom . . . and backed by over half a century's specialized "knowhow".

Ask for estimates.

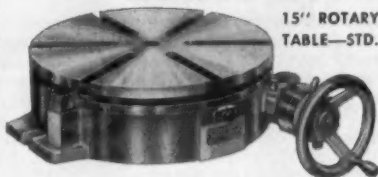
**THE ROWBOTTOM MACHINE CO.**  
WATERBURY, CONNECTICUT

Also Cam Milling and Cam Grinding Machines.  
Details on request.

For more data circle 381 on Reader Service Card

## The STEVENS Line SINCE 1925

### Introducing NEW series



15" ROTARY  
TABLE—STD.

ROTARY TABLES, 5-7½-8-12-15-18-24"  
sizes both standard and dial indexing types

ADJUSTABLE TILTING TABLES, #0-1-2

COMPOUND TABLES, #1-2

ROTARY-COMPOUND TABLES, #1-1½-2

INDEX CENTERS—multiple spindle

SPECIAL MACHINES—designed and built

See your dealer or write for bulletins

**The John B. Stevens Company**

Main Street, Somersville, Conn., U. S. A.

For more data circle 382 on Reader Service Card



**100%  
guaranteed!**

# repeats to .0001" in 30 seconds



**ONLY DEKA-BORE**

Offset Boring Head

● Can be adjusted in fractions of 1/10,000" on the full diameter as easily as reading 1/16" on a steel rule. **Not a vernier or scroll adjustment.**

● Can be calibrated in increments of .00005 on radii or .0001 on diameter as easily as picking up .002 on a conventional micrometer dial.

Attach this ad to your letterhead and mail!  
for a free demonstration or literature!

## PRECISION TOOL & MFG. CO. OF ILL.

1305 S. Laramie Ave., Cicero 50, Illinois

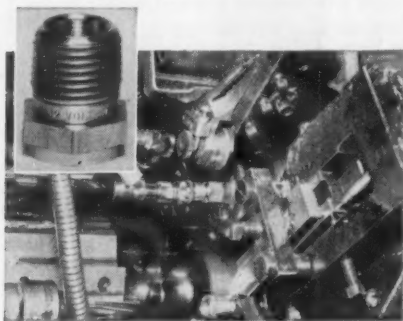
MM-8

For more data circle 383 on Reader Service Card

(Advertisement)

## OVER 8-MILLION SCREW MACHINE PARTS MARKED AUTOMATICALLY AT TWO CENTS PER THOUSAND

Automatically marking over 8-million parts such as these automotive couplings (inset) with a 21-character impression at a total cost of less than two cents per 1000 parts for complete marking equipment was accomplished by employing a single standard Model 500-C automatic roll marker and die manufactured by New Method Steel Stamps, Inc., 147 Joseph Campau, Detroit. Marking equipment is still in perfect condition.



According to J. B. Cote, President of Berlew Products, Inc., Ferndale, Michigan, total maintenance cost on the several marking operations consisted of 90 cents for a new reset spring during the 4½ years the lone marking unit has operated on the 1¼" Acme-Gridley shown tooled for the job. Cote indicated that the cost of marking these products on a secondary operation would have been many times greater due to time and labor costs involved, reduced production output and increased losses from imperfect marking.

The 8-million parts were machined from ½" hexagonal brass bar stock and were marked with a single roll die which is still in continuous operation. Use of an offset roll die permitted marking within ⅛" of the hex head. Versatility of the roll holder permits marking of many different parts with a single unit, using standard interchangeable New Method roll dies.

Marking one part every six seconds, the automatic marking unit turned out the 8,000,000 parts in a period equal to over 4½ years of continuous operation, 8 hours per day and every day of the month.

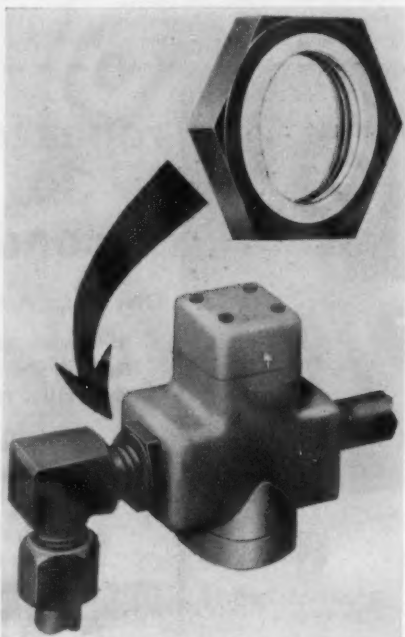
For more data circle 384 on Reader Service Card

**new shop equipment . . .**

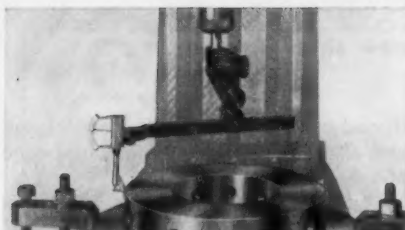
## NEW CONCEPT SEAL FITTING

A new seal-fitting that eliminates leaks at pipe thread connections without need of messy, sticky, seal compounds has been announced by the Tru-Seal Division of the Flick-Reedy Corp., 2040 N. Hawthorne Ave., Melrose Park, Illinois.

Named Tru-Seal, this seal-fitting is quickly and easily installed merely by threading it on pipe or fitting, threading pipe or fitting "hand tight" to desired position in port, tightening Tru-Seal down against pipe or fitting with only light torque required. According to the manufacturer, Tru-Seal immediately stops leaks in old installations, insures leakproof operation at pipe



**Tru-Seal Stops Threaded Connection Leaks**



# **OSLUND UNIVERSAL INDICATOR MICRO ADJUSTING HOLDER**

## **INDICATOR HAS:**

1. 360° Reading Face
2. Shockproof Mechanism
3. Constant Accuracy

## **HOLDER IS**

Equipped with two screws...one for approximate setting, the other for final adjustment. A turn of swivel clamp and indicator works to 5" diameter... with extension bar to 15".

SEND ORDERS AND INQUIRIES TO OUR

**National Distributor:**

## **NICKSON TOOL SALES CO.**

170 WASHINGTON AVE., NORTH HAVEN, CONN.

Representative Inquiries Invited, Territories Available.

Manufactured by:

## **OSLUND PRECISION PRODUCTS**

15 SIGOURNEY STREET • HARTFORD 5, CONN.

For more data circle 385 on Reader Service Card

# **GRANT RIVETERS**



• Pioneers in the riveting field. Head rivets from smallest to 3/4" diameter, either by noiseless spinning or vibrating hammer method.—Sizes to meet all needs.—Types include Vertical and Horizontal Multiple Spindles. Write for literature — and don't forget to send samples.

**THE GRANT MFG. & MACHINE CO.**

96 Silliman Ave. •

Bridgeport 5, Conn

For more data circle 386 on Reader Service Card



## *cut weld cleaning time by 85%*

Throw away your cold chisel and whisk off weld spatter with a dry rag! Protect-O-Metal spatter-proofing compounds make weld cleaning a breeze. Improve your welds at the same time... P-O-M compounds quiet the arc, improve fusion and electrode operation, prevent oxidation and annealing scale, cause no porosity. No smoke, odors, or fumes.

**P-O-M No. 2.** Non-inflammable, non-toxic, water-soluble paste. Inorganic. Thin before applying and start welding at once. \$3.30 per gallon, f.o.b. Dayton.

**P-O-M No. 8.** Rust- and corrosion-resistant resin base compound. Comes ready to use. Safe for all metals. Good paint primer; permits outdoor storage of subassemblies. \$3.35 per gallon, f.o.b. Dayton.

## **PROTECT-O-METAL**

**G. W. SMITH & SONS, INC.**

**5407 KEMP ROAD, DAYTON, OHIO**

For more data circle 387 on Reader Service Card

## **MONEY-BACK TRIAL OFFER**

Order a trial gallon of each today for testing in your shop. We'll cancel the bill if you're not satisfied.

**HIGHER SPEEDS!  
FASTER GRINDING!**

**kipp**

## AIR GRINDERS

MODEL JA  
50,000 R.P.M.

**\$42<sup>00</sup>**

IN U.S.A.



Weight 12 ounces,  
length 6¾ inches;  
chuck size ¼ inch.  
Wheel guard removed  
for better illustration.

The RPM's stay up while grinding . . . not only when the grinder runs idle. That means better work—longer wheel life.

High speed grinding with small wheels was a Madison-Kipp development of the late twenties. It was born out of a pressing need in our tool room. Because tool room grinding problems are universal, we believe it will pay you to utilize Kipp grinders in your tool room as generally as we do in our own.

**kipp**

**MADISON-KIPP CORP.**

208 Waubesa St., Madison 10, Wis., U.S.A.

For more data circle 388 on Reader Service Card

226 modern machine shop

## new shop equipment . . .

thread connections of new installations and offers the following important uses and advantages.

It is designed for use on any pipe thread, dry seal or standard; for all types of piping installations in all types of industry; for use on oil, water, air, gas, steam, vacuum and chemical fluid lines (except lines carrying fluorine gas or molten alkaline metals); for operating temperatures of minus 100 degrees F. to plus 500 degrees F.; for pressures up to 3,000 p.s.i. (15,000 p.s.i. minimum proof pressure). It is especially recommended for use in applications where leakproof operation is absolutely essential; where pipe compounds might impair circuit operation; where space limits the use of large or long pipe wrenches and on fittings that require frequent take-down and reassembly (such as test application).

For more data circle 89 on Reader Service Card

★ ★ ★

## NEW SERIES CARBIDE INSERTS

Firth-Loach Metals, Inc., Butter-milk Hollow Rd., McKeesport, Pa., has added a new series of carbide inserts to its line of "laboratory grade" cemented carbides. Among the new series are standard triangular and square throwaway inserts and Styles P and H inserts. Stocked in both utility and precision ground grades, the triangular throwaway inserts are available in six sizes and three grades, and are suited for both general machining work and fine finishing. The square throwaway inserts are carried in four sizes ranging from ⅜ by ⅛ inch to ¾ by 3/16 inch. Three grades are stocked in both the utility grind (ground top and bottom only) and in the precision grind (ground on all surfaces).

For more data circle 90 on Reader Service Card

August, 1956

*Hammond*  
OF KALAMAZOO

**2 IN 1**

**NO-DUST GRINDER**




SAVE OVER 50% FLOOR SPACE  
THE HAMMOND WAY

OLD WAY




DUST-LADEN AIR IS A MENACE!

- Protect your employees' health.
- Protect nearby machine tools from dust and grit.
- Save floor space — requires only 6½ square feet. For 10", 12", and 14" wheels.

Write for Catalog.

*Hammond Machinery Builders*  
1618 DOUGLAS AVENUE KALAMAZOO, MICHIGAN

For more data circle 389 on Reader Service Card

**DOUBLE-DUTY WITH ONE MACHINE**

TO INCREASE PROFITS  
TO SAVE TIME

**TUBE CUTTING ATTACHMENTS**

FOR ALL SIZES  
NIBBLER TYPE  
**SAVAGE**



**NIBBLING MACHINES**

FOR SLOTTING, SHAPING, CUTTING OFF  
SPECIAL TUBING-ENDS — USING GUIDE-LINE  
OR TEMPLATE.

TUBE-CUTTING ATTACHMENTS EASILY  
REMOVED FOR STANDARD NIBBLING.

Quotation on Request

**W. J. SAVAGE COMPANY**

KNOXVILLE Since 1885 TENNESSEE  
**NIBBLING MACHINE PIONEERS**

For more data circle 390 on Reader Service Card

## HOW ARE YOU FIXED FOR BOXES?

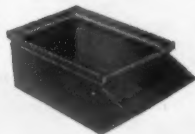
Finding a place for production parts can be inconvenient and time consuming when boxes are unavailable.



For the best steel stacking box, its Sterling—its top rim construction makes it best.

Sterling makes all types and sizes of steel boxes.

**STERLING  
FACTORY EQUIP. CO.**  
183 Charles St.,  
Providence, R. I.




**Sterling**

Quality Handling & Storage Equipment



For more data circle 391 on Reader Service Card



**new shop equipment . . .**

**COIL HANDLER WILL HANDLE  
COIL WEIGHTS UP TO  
40,000 POUNDS**

Sesco, Inc., 8881 Central, Detroit 4, Mich., has announced a heavy-duty, power-driven, "Twin-In-Action" Coil Handler. The unit is of rugged construction to insure long operating life, and is designed to carry extra heavy coil loads. It can be built to meet customer specifications, and to handle coil weights up to 40,000 pounds. It is built of standard components, in order to effect savings on construction cost. It is fully powered. The coil is picked up on the i.d. by four radially contoured power-driven expander arms, thus eliminating the danger of mutilating any portion of the coil. The four expander arms are operated in unison by positive power. The construction and

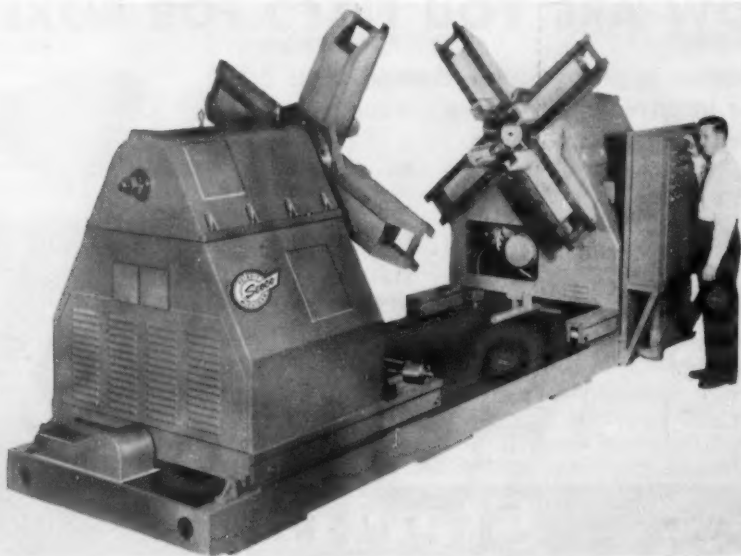
design of the expander arms is said to permit trouble-free, easy loading. The coil is handled gently, regardless of weight. Both reels are power driven and are synchronized to carry an equal part of the load. Each reel can be laterally adjusted, independent of the other, or in unison, making it easier to establish a perfect alignment with the press or die.

The accompanying illustration shows that all controls are grouped to permit one-man operation. Furthermore, it is power driven at a controlled rate, thus eliminating jerking and over-running.

Uncoiling of the stock is started by merely pressing a button. The stock flow is controlled by a simple, yet rugged, electrically operated loop control, which controls the pay off.

The "Twin-In-Action" Coil Handler will handle either steel or aluminum stock; also prepainted stock.

For more data circle 91 on Reader Service Card



**Illustration showing SESCO "Twin-In-Action" Heavy-Duty, Power-Driven Coil Handler**

## METAL CUTTING BAND SAW

W. F. Wells & Sons, Three Rivers, Mich., has introduced a new Giant metal cutting band saw, which can be engineered to meet individual specifications and which is identified as the Special Model-J. This new Giant metal cutting band saw has a cutting capacity of 38 inch rounds or squares. Height of bed from floor is 12 inches; overall machine height 8 feet 6 inches.

A 3 h.p. motor drives the blade on 4 wheels at speeds of 2,000, 1,500 and 1,000 f.p.m.—suitable for cutting carbon, aluminum, magnesium and brass. By specifying other speed ranges it becomes adaptable for cutting a variety of materials.

The machine raises hydraulically on two posts. Sealed bearings in the post housings are said to assure complete protection from all foreign matter.

A push button controlled hydraulic pump and all switches are enclosed by a dust-proof control panel.

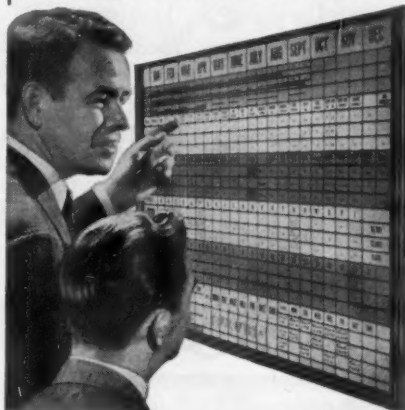
For more data circle 92 on Reader Service Card



Special Model-J Metal Cutting Band Saw

August, 1956

## How To Get Things Done Better And Faster



### BOARDMASTER VISUAL CONTROL

- ☆ Gives Graphic Picture — Saves Time, Saves Money, Prevents Errors
- ☆ Simple to operate — Type or Write on Cards, Snap in Grooves
- ☆ Ideal for Production, Traffic, Inventory, Scheduling, Sales, Etc.
- ☆ Made of Metal. Compact and Attractive. Over 60,000 in Use.

Complete price **\$49.50** including cards

**FREE**

24-PAGE BOOKLET No. MS-40  
Without Obligation

Write for Your Copy Today

**GRAPHIC SYSTEMS**

55 West 42nd Street • New York 36, N. Y.



For more data circle 391 on Reader Service Card

modern machine shop 229


**new shop equipment . . .**

### **NEW PRECISION HOLE BORER**

The need for much faster precision boring methods on production line work has long been recognized. A giant step toward solving this knotty problem has been taken by The Canton Tool Mfg. Co., Pekin Rd., E. Canton,



**USE-EM-UP TYPE**



**STANDARD TYPES**

**SLEEVES**

**AND**

**SOCKETS**

**AND A**

**complete line of COLLETS**

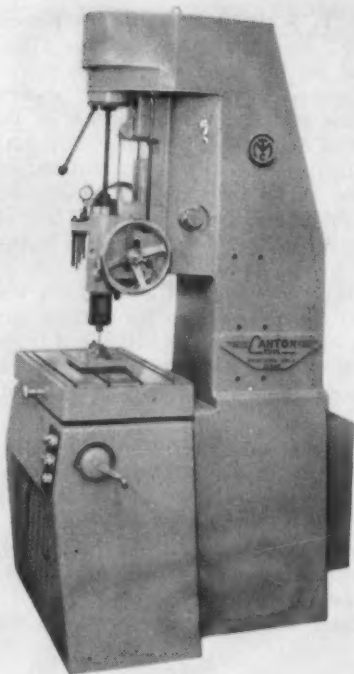
• COLLIS Taper Tools are made by men skilled in this type of manufacture. Users get long satisfactory service from COLLIS Equipment and find the answer to all drilling, reaming, and tapping needs in the COLLIS line. We can give prompt service on orders for Lathe Centers Arbors, Drill Drifts, and Magic Type Chucks as well as on Sleeves and Sockets and Collets.

**THE COLLIS CO.**

**DEPT. A, CLINTON, IOWA**

For more data circle 392 on Reader Service Card

230 modern machine shop



**Canton Tool Precision Hole Boring Machine**

Ohio, which recently announced a new precision hole borer. Tests on typical parts show that this new machine produces eight times faster than conventional boring methods—yet maintains accuracy within 0.0001 inch in hole spacing and 0.0001 inch in bore diameter. Labor and set-up costs are substantially cut.

Conventional jig-boring methods demand complete, time-consuming set-up and alignment of each piece. This new machining method eliminates this need and permits high-speed center-drilling, drilling and boring on repetitive pieces in either limited or high production.

Secret of this machine's speed and

August, 1956

accuracy is a unique template-locating pin arrangement. The template is produced with holes located on it in the positions called for by the standard blueprint (tool design drawings are not required). All the template holes are of the same size, corresponding with the diameter of the locating pin, since they are for locating purpose only.

Second step is to mount the template under the fixture that will hold the parts to be worked on. The fixture is designed to hold a wide range of template sizes. Because the template is positioned under the fixture, the tool never touches it. The template permanently retains its original accuracy.

After the workpiece has been clamped to the fixture and the fixture placed on the table of the machine, the disappearing pin—which is in exact alignment with the spindle—engages each hole in the template. Thus the exact hole locations of the master piece are faithfully reproduced in the workpiece.

Holes are bored rapidly, accurately with no positioning of table or tool required. The finished piece is precision machined — yet off the machine in a hurry.

This combination template-locating pin method makes this new precision borer a copying machine. The resultant safety and ease of operation eliminates the need for highly-skilled operators while allowing precision drilling and boring of a wide range of parts and hole requirements at high speeds.

For more data circle 93 on Reader Service Card

★ ★ ★

## PORTABLE SURFACE HARDNESS TESTER

Mechanical Devices, Inc., 10640 Harper Ave., Detroit 13, Mich., has introduced a device known as the Peabody Model ST-5 Surface Hardness Tester. This instrument measures sur-

## *Easy* TO CONTROL SPOILAGE LOSSES

When you find that your spoilage losses in tapping and reaming are running high, there's an easy way to remedy the situation if it is due, as is frequently the case, to faulty set-ups.

Just change over from ordinary tool holders to Ziegler Tool Holders. With the Ziegler all you have to do is to come within 1/32" of center on the radius (or 1/16" on the diameter) and the holder automatically compensates for the difference.

In the rejects it eliminates the Ziegler pays for itself many times over in a remarkably short time. Get one and see what a difference it will make in the precision of the work performed.

PROMPT DELIVERY



Types to fit  
any machine  
used for  
tapping or  
reaming.

## W. M. ZIEGLER TOOL CO.



**FLOATING HOLDER**  
for Taps and Reamers...

13566 AUBURN  
DETROIT 23, MICH.

WRITE FOR  
CATALOG

For more data circle 393 on Reader Service Card

## CUTTING STOCK DIAMETERS UP TO 40 INCHES?

USE

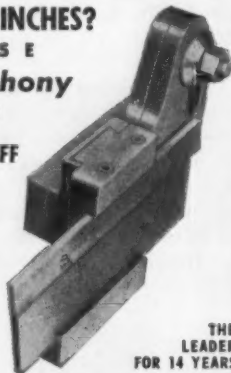
**Skee-Anthony**

(PATENTED)

**CUTTING OFF  
TOOLS**

for . . .

- ★ BORING  
MILLS
- ★ LATHES
- ★ PLANERS
- ★ SHAPERS



THE  
LEADER  
FOR 14 YEARS

Patented Pivoting Trunnion, Safety-Slip and Support Blade prevent blade breakage and injury to operator. Fast adjustment to lathe center.

Write for free descriptive folder A-1

**-SKEE TOOL COMPANY**  
1406 N. FLORES ST.  
SAN ANTONIO, TEXAS

• Few Industrial Areas Open for Representatives •

For more data circle 394 on Reader Service Card

**AUTOM**



## CONTINUOUS HINGES

Manufactured by

**AUTO MOULDING  
& MFG. CO.**

WRITE FOR CATALOG

1114 E. 87TH ST.

CHICAGO 19

For more data circle 395 on Reader Service Card

## new shop equipment . . .



Peabody Model ST-5 Surface Hardness Tester

face hardness by height of rebound of a steel hammer while held in vertical position. The instrument gives readings in Rockwell and Brinell calibrations. Because of the locking of the steel hammer at maximum rebound, a direct reading is possible. Hence, guesswork or estimating is avoided.

Designed for use in the shop, this tester reads in Brinell 3000 k.g. and Rockwell C scales up to 67. A movable scale makes calibration easy by checking against any known hardness. The Peabody will accurately check any surface from armor plate to  $\frac{3}{8}$  inch wire, including plastics and granite.

For more data circle 94 on Reader Service Card

★ ★ ★

## NEW DEVICE DEBURRS HOLES

The Vernon Devices Co., 8 Wilson Pl., Mt. Vernon, N. Y., has announced a tool to deburr tapped holes called the Burr-Bit. According to the manufacturer, the problem of chamfering a tapped hole no longer need be a separate operation. With the Burr-Bit this operation may now be accomplished while tapping. The Burr-Bit is slipped over the tap and then tightened in position. The device operates while the tap is being withdrawn and consequently shaves off the raised thread or burr, thereby creating a clean hole.

The device is precision made of fine grade high-speed tool steel. A special set screw, running inside the flute of the tap, does all the driving and is claimed to be efficiently used on practically all types of materials.



Vernon Devices Burr-Bit Deburring Tool

The Burr-Bit also operates efficiently where the material to be tapped is thin, because the chamfer is made just deep enough to remove the burr without removing too many threads. The Burr-Bit will fit two and four fluted taps from number 2 to 5/16 pitches.

For more data circle 95 on Reader Service Card

## TABLE EXTENSIONS SIMPLIFY SETUPS FOR SAWING METAL PLATE

Setups for straight or angle cuts in metal plate or flat stock are made in a few minutes with a new table accessory, manufactured by The DoAll Co., 254 N. Laurel Ave., Des Plaines, Ill., for their Contour-matic Sawing Machines. Simple, but extremely convenient, this accessory consists of T-shaped bars designed to fit the T-slots in the hydraulically actuated tables characteristic of these machines. The bars can be slid in or out of the table slots independently, and quickly locked in any position with an Allen wrench. In this manner the bars can be adjusted to provide outboard support for stock longer than the capacity of the table.

Studs on the ends of the bars serve as stops. The bars can be adjusted so that the studs bear against the edges of rectangular or irregularly shaped



## VAILL TUBE END-FORMING MACHINES

have hundreds of tube end-forming and shaping applications . . . Fast, accurate production at less cost. Beading • Flaring • Flanging • Sinking • Expanding • Grooving • Threading • Reducing • Double Lap Flaring • Double Lap Flanging. On tubing up to 6 in. diameter.

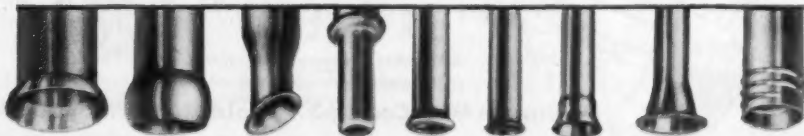


**FREE**—New Bulletin T-1 shows and describes the versatility of Vaill Tube End-Forming Machines.



## THE VAILL ENGINEERING COMPANY

133 E. MAIN STREET • WATERBURY 20, CONNECTICUT



For more data circle 396 on Reader Service Card



## new shop equipment . . .

pieces, which have been placed on the band machine table in the desired position for cutting. A twist of the table feed control and the stock is carried into the saw band for cutting at the desired angle. Once the bars are set, any



ACCURACY of costly machine tools may be ruined using ordinary bolts of soft steel. It is low cost insurance to use Boyar-Schultz precision made T-Slot bolts. Made from heat treated, Alloy steel, heads machined at right angle to shank, to present a broad, flat surface to upper surface of T-slots. Class 3 threads do not strip or distort.

**BOYAR-SCHULTZ CORPORATION**  
2020 SOUTH 25TH AVE., DEPT. F-8, BROADVIEW, ILL.  
For more data circle 397 on Reader Service Card



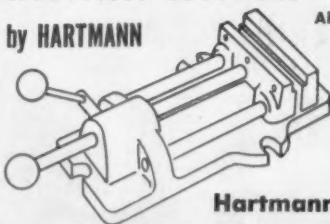
DoAll Band Saw Table Accessory in use

number of similar pieces can be cut rapidly. Unload and load time is negligible because clamps and hold downs are not required. The perpendicular cutting force of the saw band holds the work on the table. Further reduction in load-unload time can be achieved for even more rapid production cutting through the use of a foot control for the hydraulic feed table. In use, the table extension bars have proven to be a versatile and highly flexible back stop for repetitious production cutting at all angles.

For more data circle 96 on Reader Service Card

## INSTANT ACTION

by HARTMANN

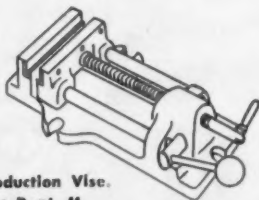


## RAPIDSET

All Purpose Tool Room And Machine Shop Vises.

## The JAWSET

Adjustable Pressure Production Vise.  
For Information Write Dept. M.



**Hartmann Mfg. Co., 1637 Goold St., Racine, Wis.**

For more data circle 398 on Reader Service Card

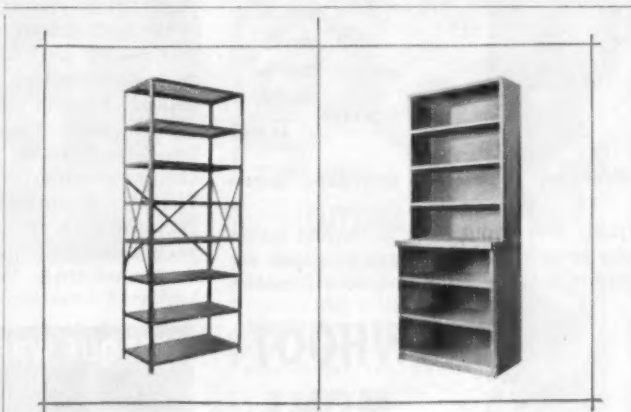
## IMPROVED SPRAY APPLICATION OF CUTTING OILS

A new Spray-Lube system, announced by C. A. Norgren Co., 3499 S. Elati St., Englewood, Colo., is claimed to apply a more uniform and higher quality spray of cutting oil directly upon the close interfaces between the tool and workpiece. It can be directed from the underside of the curled chip or from any other angle that will best reach the critical lubrication points. The spray of coolant exposes a very large fluid surface area and thus absorbs more heat, faster. With this system, the flow of air and cutting oil is said to be more accurately controlled. The oil spray is produced within the nozzle itself by means of a tube within a tube, resulting in a spray that is consistently uniform in quality. The spray is delivered to the cutting area the instant the machine is turned on. There is no sputtering or intermittent flow.

Control valves for the spray are designed in order that they may be closely mounted in a manifold for multi-point

application of Spray-Lube. They can easily be adjusted to regulate the flow of both air and liquid to deliver exactly the right spray for any metal cutting operation. Allen-head adjusting screws are recessed in the valves, preventing tampering.

The Spray-Lube unit is compact and convenient to install. A single filter-regulator unit filters the air and regulates the pressure of both air and li-



## **HALLOWELL** adjustable shelving

Build efficient, custom-designed storage facilities with standard HALLOWELL shelving units. Made of prime cold-rolled steel—multiple pierced and precision formed for easy assembly and complete interchangeability—phosphate coated and finished in gray or green baked-on enamel. Ledge type, counter type, or vertical type units. Shelf sizes from 24 by 12 to 48 by 36 in., heights from 39 in. to 10 ft. 3 in. See your industrial distributor for details. Or write Hallowell Shop Equipment Division, STANDARD PRESSED STEEL Co., Jenkintown 22, Pa.

STANDARD PRESSED STEEL CO.

**HALLOWELL** SHOP EQUIPMENT DIVISION

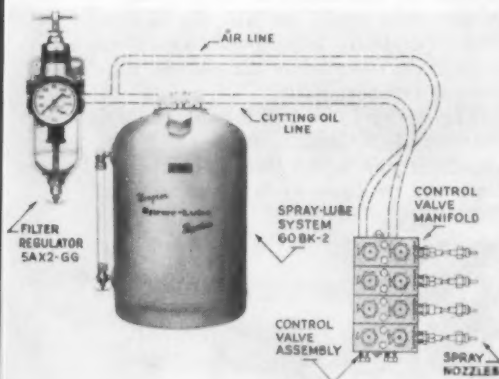
**SPS**

JENKINTOWN PENNSYLVANIA

For more data circle 399 on Reader Service Card

modern machine shop 235

**new shop equipment . . .**



*Illustration of Norgren Spray-Lube System*

quid. The liquid filter is located inside the reservoir. An average size unit occupies a space only 14 x 20 x 7 inches

with a 2 gallon liquid reservoir. For most operations, a spray uses only 4 to 12 fluid ounces of cutting oil per hour. For more data circle 97 on Reader Service Card

★ ★ ★

**AIR-OPERATED SLIDE FEED  
FEATURES OPEN-THROAT DESIGN**

U. S. Tool Co., Inc., Ampere (East Orange), N. J., has recently announced the addition to its line of the Model ASF-12 air-operated slide feed, which is the open-throat type. With the standard model, feed lengths adjustable up to a maximum of 12 inches can be obtained. Longer feed lengths are possible by using a counting device, which can be supplied as an extra. Width and thickness capacity of this unit are as follows: up to 15 inches wide x 0.032 inch thick, up to 12 inches wide x 0.062 inch thick and up to 6 inches wide x 0.125 inch thick. With the air-operated

**WHOOT  
MON!**



You really get your money's worth when you buy precision screw machine products made by "you know W.H.O.\*"

CAP SCREWS • COUPLING BOLTS  
SET SCREWS • MILLED STUDS

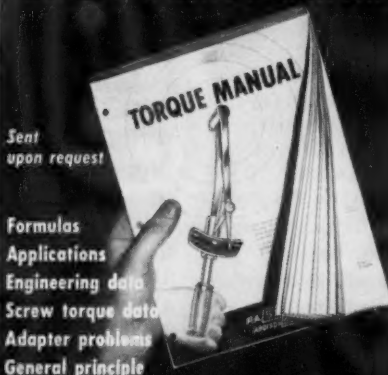
. . . our specialty.

*\*Wm. H. Ottumiller Co.*  
**YORK, PENNA.**

For more data circle 400 on Reader Service Card

236 modern machine shop

**"TORQUE WRENCH" MANUAL**



Sent upon request

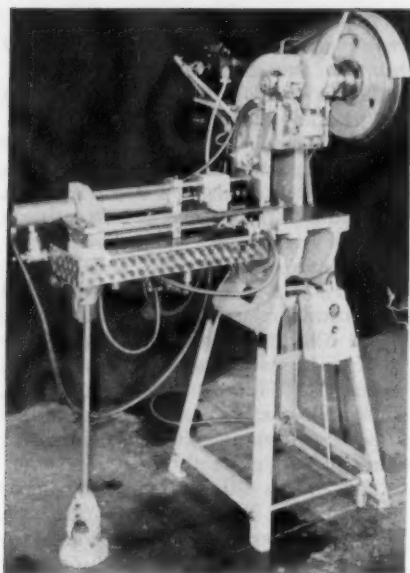
Formulas  
Applications  
Engineering data  
Screw torque data  
Adapter problems  
General principle

**P.A. STURTEVANT CO.**  
**ADDISON QUALITY ILLINOIS**

Manufacturers of over 85% of the torque wrenches used in industry

For more data circle 401 on Reader Service Card

August, 1956



U. S. Model ASF-12 Air-operated Slide Feed

slide feed, mechanical connections to the press are not required.

For more data circle 98 on Reader Service Card

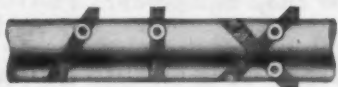
★ ★ ★

## CUTTING FLUID FOR HEAVY-DUTY WORK

Purosol H. D., a new heavy-duty soluble cutting fluid for heavy-duty work and for general machine shop work, has been announced by the Industrial Marketing Department of the Pure Oil Co., 35 E. Wacker Dr., Chicago 1, Ill. Unlike conventional heavy-duty soluble oils, Purosol H. D. contains an effective extreme pressure additive that permits it to be used as a satisfactory replacement for many types of higher priced sulfurized cutting fluids. Purosol H. D. protects against rust and gumming and has exceptional emulsion stability.

For more data circle 99 on Reader Service Card

August, 1956



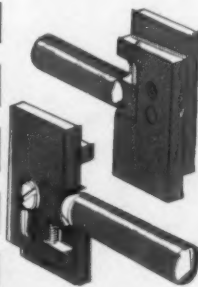
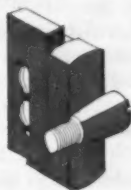
## A BETTER BORING BAR

because our method of broaching square holes makes a better fit for the tool bit. This means more rigidity and longer life, especially with tungsten carbide.

Square hole sizes range from  $\frac{1}{8}$ " up to and including  $\frac{3}{4}$ ".

### TYPE "B" & "C" CUTTERS

A strong rigid serrated 2-bladed cutter-located in the bar with a taper pin. Bore holes accurately to close limits. Can be expanded and reground giving long life. Sizes  $\frac{7}{8}$ " dia. up to 6".



A simple 2-bladed reaming cutter. Can be expanded and reground. Located in the bar by a hardened V. This V never has to be reground as blades are expanded. Fits other bars with slots

$\frac{3}{8}$ " x  $\frac{7}{8}$ "     $\frac{3}{8}$ " x  $1\frac{1}{8}$ "  
 $\frac{1}{2}$ " x 1"     $\frac{3}{8}$ " x  $1\frac{1}{2}$ "

## THE DETROIT BORING BAR CO.

688 E. FORT ST.

DETROIT 26, MICH.

Established



1927

For more data circle 402 on Reader Service Card

modern machine shop 237

**new shop equipment . . .**

### **ROTARY GEAR SHAVER EXPANDS FIELD OF CROWN SHAVING**

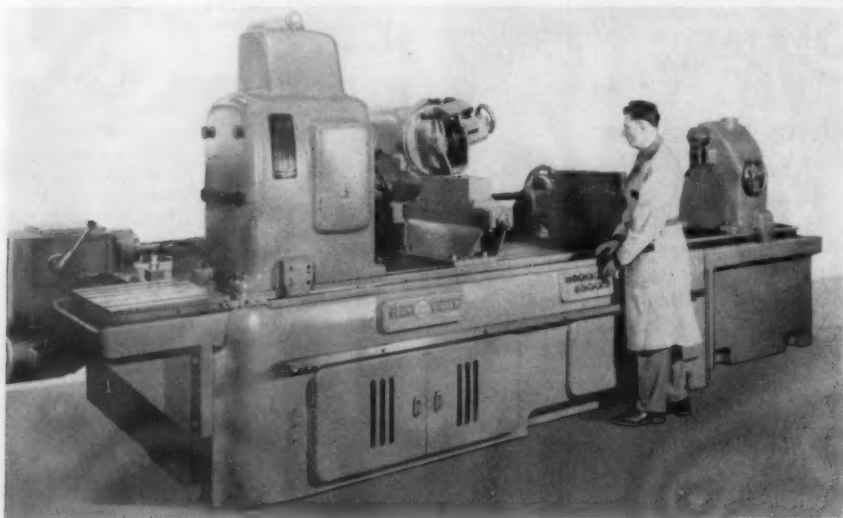
A new Red Ring Model GCJ-48 inch rotary gear shaver, that expands the field of crown shaving to include external gears up to 48 inches pitch diameter and 62 inches between centers, is now available from National Broach & Machine Co., 5600 St. Jean Ave., Detroit 13, Mich. Previously, the largest gear in the world that could be crown-shaved measured 36 inches between centers. This has been accomplished on the Model GCJ-36 inch Red Ring machine, which is still on the market.

Spur and helical gears up to 12 inches wide and 52 inches o.d. in the 2 to 16 diameter pitch range can be crown-shaved on the huge new machine. Shaving without crowning can be done on spur and helical gears up

to 36 inches wide and 142 inches between centers in the same tooth size range on the machine.

Crown shaving is accomplished on the machine by the Red Ring-originated rocking table action, in which the table supporting the head and tailstocks is rocked around a center pivot while the gear is power driven in mesh with a reciprocating gashed rotary gear shaving cutter. With this conventional shaving method, the Elliptoid tooth form is produced on the gear teeth. This form has slightly thinner tooth sections at the ends of the teeth than in the middle portion and, thus, avoids the detrimental operating effects resulting from tooth end bearing or shaft misalignment.

The Model GCJ-48 inch rotary gear shaver has a one-piece cast iron base. The cutter head is mounted on a saddle at the rear of the machine. The work drives the cutter, which is meshed with the work gear in crossed axes relationship during the shaving proc-



*Illustration showing the new Red Ring Model GCJ-48 inch rotary gear shaving machine*



ess. Either manual or automatic means can be used to feed the cutter into the work in selected increments from 0.001 to 0.003 inch at the end of each stroke of the cutter. Direction of rotation of the work is reversed at each end of each stroke to assure uniform shaving of both sides of the teeth. Axial travel of the saddle is controlled by a transmission that is clutched to provide both feed and traverse speeds. Separate motor drives are provided for headstock rotation, cutter reciprocation and coolant pump. Pushbuttons control all machine functions.

Cutters used on the Model GCJ-48 inch machine are 7, 9 and 12 inch diameter. The machine has a floor space about 113 x 114 inches and is 82 inches high overall. It weighs 44,500 pounds. A 5 h.p. motor drives the headstock and a 3 h.p. motor powers the cutter reciprocation drive.

For more data circle 100 on Reader Service Card

## ROTARY AIR GRINDER FEATURES STREAMLINED, LIGHTWEIGHT DESIGN

The latest in a series of advanced air and electric tools being designed, engineered and produced by Thor Power Tool Co., Aurora, Ill., to help industry speed production, was recently announced. It is the 25G rotary air grinder; a streamlined, lightweight unit which is derived from the company's No. 2 series. An outstanding feature is that it produces 23 per cent more power than former models in this series. It replaces Model OOD in the Thor line.

Designed primarily for precision die work, the grinder is equally adapted to production grinding operations in shops and laboratories and to bench duties. Weighing only 2 pounds with an overall length of 11½ inches, the tool has a wheel size of 1¾ inches bonded capacity. It operates at a speed

★ ★ ★ ★ ★

**People work better when they SEE BETTER®**

### 3-D Girl at SKF

*Magni-Focuser multiplies the power of this girl's eyes as she inspects a tiny ball bearing at SKF Industries, Inc.*



#### MAGNI-FOCUSER's

matched prismatic lenses give needle-sharp magnification. Comfortably light weight. Fits over regular glasses. Leaves both hands free. Normal vision may be resumed by lifting head.

## MAGNI-FOCUSER

**SPEEDS PRODUCTION**  
**With Third Dimensional (3-D) Vision**  
**Leaves both hands free to work**

Magni-Focuser—the binocular magnifier—reduces eye-strain and prevents squinting—thereby speeding production, increasing accuracy and minimizing the chance of errors and accidents.

Gauge reading, layout work, inspection, tool and die work are just a few of the jobs that need the Magni-Focuser. Speeds precision assemblies, blue print work. Restores the usefulness of the skilled hands of many older workers whose vision needs a seeing aid.

Magni-Focuser can help your plant produce better. Immediate delivery. 10-day trial without obligation. Return to us if not satisfied. \$10.50.

**Send for descriptive folder**

**EDROY PRODUCTS CO.**

480 Lexington Ave.,  
Dept. P, New York 17, N. Y.

For more data circle 403 on Reader Service Card

August, 1956

modern machine shop 239



## new shop equipment . . .

of 20,000 r.p.m. on air pressure of 90 pounds. It has a  $\frac{1}{4}$  inch air inlet pipe thread and takes a  $\frac{3}{8}$  inch minimum hose size.

According to the manufacturers, chief features of the Model 25G, in addition to the notable increase in power and the decreased weight, are a re-



View showing Thor Model 25G Air Grinder

duction in the number of working parts, a 360 degree adjustable exhaust position and a thumb-type throttle for more sensitively controlled power feed.

An advantage of this tool and its 90 companions in Thor's No. 2 series is the complete interchangeability of parts with drills, screw-drivers and nut setters in the same series. Besides grinding wheels, the attachments which can be used with the basic tool include mounted points, rotary files, steel cutters, soft felt and rubber polishers.

For more data circle 101 on Reader Service Card

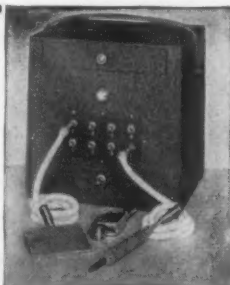
★ ★ ★

## CARBIDE TOOL GRINDER FEATURES OSCILLATING SPINDLE

Hammond Machinery Builders, Inc., 1615 Douglas Ave., Kalamazoo, Mich., has introduced the Model OCE-6 Oscillating Carbide Tool Grinder. The grinder is adapted for either conventional grinding or, connected to a power pack, for electrolytic grinding.

The outstanding feature is the oscillating spindle, relieving the operator of the effort of manipulating the tool. The tool is held in stationary position, while the oscillating wheel does the

**MARK  
IRON,  
STEEL  
and  
CARBIDES**



**THE  
Etchograph  
WAY**

Original Electric Etcher, Thousands in Daily Use Mark hardened parts, tools, dies, gages and fixtures of any ferrous metals including the hardest alloys and carbides — quickly — plainly. • Three sizes to meet all requirements.

• Write for circulars and prices.

**BREWSTER-SQUIRES CO.**

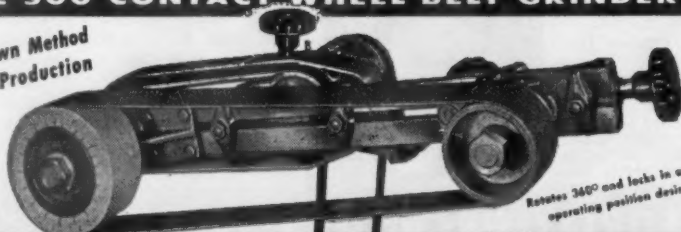
P. O. Box 601

Englewood, N. J.

For more data circle 404 on Reader Service Card

## MODEL 500 CONTACT WHEEL BELT GRINDER

**The Fastest Known Method  
of Increasing Production**



Rotates 360° and locks in any operating position desired.

WRITE FOR COMPLETE INFORMATION  
ON INCREASING YOUR PRODUCTION

**B & E MFG. CO., INC.**

2104 EAST 31 STREET  
KANSAS CITY 9, MISSOURI

For more data circle 405 on Reader Service Card

work. In addition to elimination of manual effort with consequent time saving, the oscillating spindle is claimed to assure uniformly flat grinding, and make possible long life for the diamond wheel, as the face is being uniformly worn and frequent dressings are not required. The spindle is precision engineered with heavy-duty construction, with the entire spindle assembly dynamically balanced. It oscillates on a tapered roller bearing rocker, resistant to end and radial thrust.

Wheel oscillation has two variables—oscillations per minute and length of stroke. Both are controlled by hand-wheels located on the front of the machine for operator convenience. Oscillations can be adjusted between 0 and 70 per minute. Length of stroke, or amplitude, can be varied to accommodate tools from  $\frac{1}{4}$  to 2 inch face, using a  $\frac{3}{4}$  inch face diamond type wheel.



Model OCE-6 Oscillating Tool Grinder

August, 1956



### DRILL THESE HOLES

BY A QUICK, EASY, INEXPENSIVE METHOD

Your business letterhead will bring literature.

**WATTS BROS. TOOL WORKS**

Wilmerding, Pa.

For more data circle 406 on Reader Service Card

## CAM MILLING JIG BORING



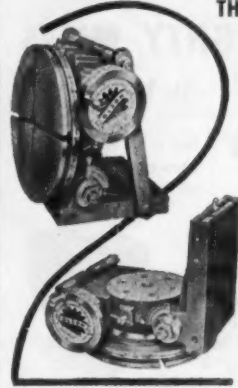
A SPECIALIZED CAM  
MILLING SERVICE,  
JIG BORING  
... SPOT WELDING  
... CONTRACT PRODUCTION  
EXPERIMENTAL DEVELOPMENT

SEND FOR NEW CATALOG NO. 52-CN

**EISLER ENGINEERING CO., INC.**  
734 S. 13TH ST., NEWARK 3, N. J.

For more data circle 407 on Reader Service Card

## THE TWO IN ONE



COMBINATION  
ROTARY TABLE  
AND  
ANGLE PLATE

PRECISION  
ACCURACY

WORM adjustable  
from  
0 to 90  
degrees.

VERNIER  
control to  
within  
2 seconds of Arc.

WRITE FOR FOLDER

Makers of Helical Gear Speed Reducers.  
Worm and Gear Speed Reducers, Stand-  
ard and Special Gears. Wedge-Lock  
Turret for Lathes and Turret Lathes.  
Open territory available to representatives

**OLSON INDUSTRIAL PRODUCTS, INC.**

40 W. WATER ST.

WAKEFIELD, MASS.

For more data circle 408 on Reader Service Card

modern machine shop 241

## Small TAPER PINS

Diameter up to .125" — Length up to 1"

Hardened and Ground

Taper Tolerance .0001" In Length Of Pin  
Diameter Tolerance .0005"

Send Specifications for Quotations

## COMMERCIAL CENTERLESS GRINDING CO.

5505 CEDAR AVE. Phone EN 1-3412 CLEVELAND 3, O.

For more data circle 409 on Reader Service Card

## TWO MIGHTY MITES

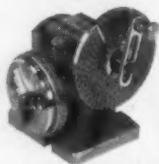


The ROTARY TABLE,  
CS-67,

has a 5" working surface and a 1½" overall height.

DIVIDING HEAD,  
CS-65,

is a standard 40:1 ratio crank indexing. Overall dimensions with 2½-inch 3-jaw chuck — 4" x 4½" x 4½".



Folder upon request.

*Custom*

**SCIENTIFIC INSTRUMENTS, INC.**

541 DEVON STREET

KEARNY, N. J.

For more data circle 410 on Reader Service Card

242 modern machine shop

## new shop equipment . . .

V-belt drive is from 1 h.p. motor. Self-contained unit, accommodating either conventional coolant or electrolytic solution, is mounted inside the base. Outlets in hood provide for complete mist removal when connected to a Hammond MistKolector.

For more data circle 102 on Reader Service Card

★ ★ ★

## TAPPING HEAD CONTROLS DRIVING TORQUE TO SUIT WORK MATERIAL, TOOL TYPE AND TOOL SIZE

A new adjustable-clutch tapping head, which provides automatic torque control for a broad range of working conditions, has been announced by the Davis Boring Tool Division, Giddings & Lewis Machine Tool Co., Fond du Lac, Wis. Known as the "Tap-Saver," this tapping head regulates driving torque automatically, according to the hardness of material and type and size of tap, after a simple dial setting is made. Through this unique action, thread accuracy and finish are said to be improved substantially and output per tool is increased. Tap breakage is claimed to be virtually eliminated and sharp cuts in overall machining time are realized. Threads can never be forced or "chattered" when the spindle is withdrawn, as it elevates slightly ahead of the tap so that the tap leaves the hole by spring retraction. This eliminates damage to the starting threads.

The Tap-Saver can be used effectively for drilling, reaming, spot facing and counterboring, in addition to right or left hand tapping. A Quick-Change chuck permits rapid tool changes for different operations, using special tap and drill collets which are a part of

August, 1956

the set. Also, a series of operations such as drilling, reaming and tapping the same hole can be performed in sequence without repositioning the machine spindle or the work. Only the collet and tool are changed. As a result, perfect alignment is maintained between the hole and spindle centerline through progressive operations, and production time is thereby reduced.

Only one simple manual adjustment is required by the Tap-Saver. A threaded sleeve is rotated until it advances to an indicator line to the particular metal to be machined. Once set, the tapping head and its collets automatically provide the correct driving torque for that material, as well as for every type and size of tool to be used. A single setting of the selector will thus cover all work on any given metal.

The Tap-Saver Tapping Head is available in three standard sizes to accommodate Morse taper shank drill collet Nos. 2, 3 and 4, respectively. Each head is supplied as part of a complete set which includes 10 collets

to fit, and a storage box for convenience and protection. The box is fabricated from heavy gauge steel, and has a piano-type hinge on the lid. Each set provides three drill collets of the proper number and seven assorted tap collets for right or left hand taps. The three sizes of sets accommodate a range of tap collets from 1/4 inch through 2 inch diameter. Additional tap collets and

## FIRST for secondary finishing...



### SCHAUER SPEED LATHES

*Filing cast iron flange with  
variable speed type VA3CCA  
Schauer Speed Lathe.*

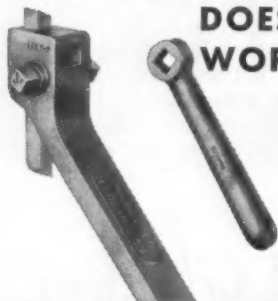
Schauer Speed Lathes provide the most economical method for performing secondary finishing work on metal and plastic parts. Do filing, trimming, deburring, lapping, polishing, etc., faster, at lower costs on Schauer Speed Lathes. Many sizes and models with holding devices to suit the job. *Speed your production* with Schauer Speed Lathes. Write for Catalog No. 530.

## SCHAUER MANUFACTURING CORP.

4501 Alpine Ave. • Cincinnati 36, Ohio

For more data circle 411 on Reader Service Card

# ONE TOOL HOLDER DOES THE WORK OF TEN



ONE tool holder for all positions . . .  
No tool chatter . . . can do internal  
boring or internal threading . . . Ideal  
for carbide tools . . .

Bit sizes:  $\frac{1}{4}$ ",  $\frac{3}{16}$ ",  $\frac{1}{2}$ ",  $\frac{7}{16}$ ",  $\frac{1}{2}$ ",  $\frac{5}{8}$ "

Furnished with Cobalt Bits

**ACME TOOL CO.**

73 W. Broadway New York 7, N. Y.

For more data circle 412 on Reader Service Card

# TROYKE

## ROTARY TABLES

- Saves fixtures and time consuming setups.
- Saves time in circular positioning.



### WORM WHEEL OPERATED ROTARY TABLES

Five Sizes: 9", 12", 15", 18", 21"

For die sinking, jig boring, cam milling. Indispensable in wood and metal pattern shops.

WRITE FOR FREE CATALOG No. 22.



**TROYKE MFG. CO.**

11,294 ORCHARD STREET  
CINCINNATI (SHARONVILLE), OHIO

For more data circle 413 on Reader Service Card

244 modern machine shop

## new shop equipment . . .



Illustration showing Davis Tap-Saver automatic torque control tapping head

Morse taper drill collets may also be ordered in any size required. Davis tapping heads are regularly supplied with Morse taper shanks for mounting on the machine spindle. Shanks can be furnished in Morse taper Nos. 3 through 7. On special order, Tap-Saver Tapping Heads can also be equipped with shanks having special draw key slots to fit practically any machine. The tapping heads are also supplied with G&L Quick-Change taper shanks and with shanks to fit other machines. For more data circle 103 on Reader Service Card

★ ★ ★

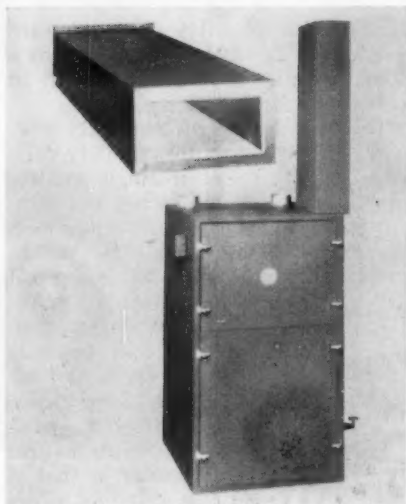
## EXHAUST SILENCER DESIGNED FOR DUST COLLECTORS

Intended for use wherever extra quiet operation is desired on Torit cabinet-type dust collectors is the new exhaust silencer, a product of Torit Manufacturing Co., Dept. KP, 296 Walnut St., St. Paul 2, Minn. The silencer is available in five models, to fit the exhaust openings on the 50, 60, 70 and 80 series and the Model 122 collectors. Although all Torit dust collectors are designed to run quietly, some applications require even greater noise suppression for employee comfort and operating efficiency.

The three smaller models are made of 20 gauge steel and extend 30 inches above the top of the collector to further reduce the noise effect. The two larger models are built of 16 gauge steel and extend 36 inches. All five are rectan-

August, 1956





**Torit Exhaust Silencer for Dust Collectors**

gular in cross-section and are interlined with 1 inch closed cellular vinyl

foam, that is said to absorb approximately 80 per cent of the noise without restricting air flow. All silencers are given a baked-on wrinkle finish to match the Torit cabinets. They can be readily attached to new Torit units at the factory or to collectors now in use. For more data circle 104 on Reader Service Card

★ ★ ★

### UNIVERSAL GRINDERS FEATURE IMPROVEMENTS IN ACCURACY, VERSATILITY AND OPERATION

Notable improvements in accuracy, versatility and ease of operation for its 12, 14 and 18 inch universal grinding machines have been announced by Cincinnati Grinders, Inc., Cincinnati 9, Ohio. "Filmatic" bearings have been retained for the grinding wheel spindle. Multiple segments support the spindle accurately and rigidly on high



**6" Universal Dividing Head**

**with**

**DIRECT INDEXING**

Optional SWIVEL BASE converts a conventional dividing head into a universal work head or rotary table. Change-over is accomplished in seconds without tools or wrenches.

Also available in 10" - 12" sizes and in 10" - 12" spiral drive.

**Write for Folder**

**CARROLL DIVIDING HEAD CO.**

3525 Cardiff Ave. • Cincinnati, Ohio



**COMBINED DRILLS**



**and COUNTERSINKS**

● Both old and new series carried in stock for immediate delivery. Finest high speed steel. Ground spiral flutes. New standard simplifies and improves size progression. New comparison chart mailed on request. Shows new standard sizes—both plain and bell type. Specials to your blue prints.

**KEO CUTTERS**

19326 Woodward - Detroit 3 Mich.

For more data circle 414 on Reader Service Card For more data circle 415 on Reader Service Card

August, 1956

modern machine shop 245

## new shop equipment . . .

pressure, wedge-shaped films of oil. The bearings are self-adjusting for heavy roughing cuts or light finishing cuts and require no maintenance for the service life of the machine. Lubrication of the spindle bearings is automatic and positive, and an automatic cut-out is provided to stop the spindle

drive motor if lubricating pressure should fail. The 12 inch machine has a 3 h.p. spindle drive motor; 14 and 18 inch machines have 5 h.p. motors.

The table feed is hydraulically powered and feed rates are infinitely variable, by means of a single control knob, from 3 to 240 inches per minute for the 12 inch machine; from 3 to 220 inches per minute for the 14 and 18 inch machines. Table reversal

may be automatically dog controlled from full rate stroke to as little as 3/32 inch, short enough to produce an effect similar to that of a grinding wheel reciprocating attachment. Accuracy of table reversal at any table speed is within 0.004 inch. Table tarry at reversal is independently adjustable for each end of the stroke from 0 to 5 seconds. Hand traverse of the table is mechanically driven and has two rates — a fast movement of 1 inch per revolution of the hand-wheel for set-up purposes and a slow movement 0.2 inch per revolution for fine adjustments and for shoulder grinding operations.

Hand cross adjustment of the



**STEEL**  
**Stanho**  
**PRODUCTS**

# Taper Pins

made solid for

- ✓ STRENGTH
- ✓ SAFETY
- ✓ ACCURACY

**Proven Durability plus Precision and Economy... Clean Bright Finish**

"Stanho" Taper Pins are made from selected steel bars, microscopically free from any defects. Milled or centerless ground precision types. Also available made from Stainless Steel, Monel, Brass, Aluminum or other metals to your specifications. Prompt shipments . . . in bulk or conveniently packaged.

Stocked in all sizes #7/0 thru #14.

Special diameter sizes made to order

"Stanho" makes a complete line of SOLID Taper Pins, Straight Pins, quality Colter Pins, Woodruff Keys, Machine Keys and special parts to order.

Write for catalog and prices

JM-7

**STANDARD** Since 1872  
**HORSE NAIL CORP.**  
NEW BRIGHTON, PA.

For more data circle 416 on Reader Service Card



Overall view of Cincinnati Improved "Filmatic" Universal Grinding Machine

wheelhead is accomplished with a two-speed handwheel control which provides 0.250-inch cross movement per re-

volution of the handwheel in fast feed; 0.050 inch per revolution in slow feed. Minimum cross feed adjustment is 25

## MORRISON 1" AUTOMATIC KEYSEATER

Investigate the many features of this new Keyseater. It has automatic feed, automatic stop to cut off feed at given depth, automatic relief to back the work away from the cutter, automatic centering, automatic lubrication and no bushings required.

Write for more information on the finest Keyseater on the market.



**THE D. C. MORRISON CO.**

P. O. BOX 1017R • CINCINNATI 1, OHIO

For more data circle 417 on Reader Service Card  
August, 1956

## INSPECTION PROBLEMS?

This booklet is for you!



Free on request

Fill in and mail today

This comprehensive, elaborately illustrated booklet provides practical information on the use of the famous A. C. M. I. Borescope in various industries, for the inspection of interior areas or surfaces not otherwise visible—together with full data on the types of Borescopes available, and on their care and maintenance. Have you received your copy?

To American Cystoscope Makers, Inc.

1341 LAFAYETTE AVENUE

NEW YORK 39, N. Y.

Gentlemen: Please send me without obligation a copy of your booklet on Borescopes.

Name \_\_\_\_\_  
Firm \_\_\_\_\_  
Address \_\_\_\_\_  
City \_\_\_\_\_ State \_\_\_\_\_

For more data circle 418 on Reader Service Card  
modern machine shop 247

## new shop equipment . . .

millionths, or 50 millionths on the work diameter. The handwheel is provided with a clutch release lever to simplify setting up.

Automatic pickfeed at table reversal is hydraulically actuated and infinitely variable from 0.0002 to 0.005 inch on the diameter in the low crossfeed range; 0.0005 to 0.0125 inch in the high range. The pickfeed mechanism automatically picks all the way to size against the positive stop. A convenient control knob permits selection of pickfeed at either or both ends of the work.

Headstock speeds are infinitely variable from 55 to 550 r.p.m. for the 12-inch machine; 22 to 225 r.p.m. or 40 to 360 r.p.m. for the 14 and 18 inch machines. The infinitely variable mechanical drive provides constant horsepower output at all speeds. Headstock speeds are selected with a single control

knob and speed setting is indicated by a graduated dial. The headstock can be swiveled 30 degrees away from the wheelhead, or 90 degrees toward the wheelhead for face grinding operations. Both live and dead spindle operation is provided, and the lathe standard spindle nose permits rapid mounting of standing chucks without the need for adapters.

The footstock has both handwheel and quick-acting lever type spindle retraction. A convenient truing bracket is provided on the footstock housing in addition to the table type truing bracket supplied. The footstock spindle is chrome plated for long life.

A hinged type internal grinding attachment is mounted on the front of the wheelhead where it can be swung up out of the way for conventional grinding operations or instantly swung down into position for internal grinding when needed.

For more data circle 105 on Reader Service Card



### DORMAN

#### AUTOMATIC REVERSE TAPPERS

- Automatic Torque Control, One Minute to Adjust, Prevents Tap Breakage, Operator Need Not Be Skilled.
- WIDE RANGE TAP CAPACITY.

No. 1A FRICTION DRIVE TAPPER — capacity No. 2-56 to 3/8" in Steel — 1/2" in Aluminum.

No. 2B POSITIVE TAPPER—capacity 3/8" to 7/8" in Steel.

No. 3A POSITIVE TAPPER—capacity 1/2" to 1 1/4" in Steel—1/2" to 3/4" Pipe Taps.

No. 4A TAPPER — capacity 3/4" to 2" in Steel including Pipe Taps.

- PRODUCTION THREADERS with Round Split . . . Button . . . Acorn Dies.

**PRICED FROM \$50.00**  
**Write for Bulletin**  
**IMMEDIATE DELIVERY**

THRIFTMASTER PRODUCTS CORPORATION  
Division of Thomson Industries, Inc.  
1034 N. PLUM STREET, LANCASTER, PA.  
STANDARD UNIVERSAL ADJUSTABLE AND SPECIAL FIXED CENTER DRILLHEADS

For more data circle 419 on Reader Service Card

248 modern machine shop

## NIELSEN

### Heavy Duty

### Live Centers



Adapted for heavy duty work. Precision type ball and roller bearings assure maximum capacity for high speed production and long service.

**Write for catalog**  
**M on live centers**

**NIELSEN, INC.** LAWTON, MICHIGAN

For more data circle 420 on Reader Service Card

August, 1956

# DoALL

PRECISION GROUND  
FLAT STOCK

TOOL and DIE STEEL  
AIR and OIL HARDENING

**Cuts Tool, Die, Gage and  
Fixture Costs 22% or More  
By Eliminating Surface Grinding!**

Air Hardening Tough Abrasive Jobs	Oil Hardening Proven Analysis
Carbon ....1.00%	Carbon ....0.09%
Manganese ..0.50%	Manganese ..1.20%
Chromium ..5.00%	Silicon ....0.30%
Molybdenum 1.25%	Tungsten ..0.50%
Vanadium ..0.30%	Chromium ..0.50%
	Vanadium ..0.20%

Size is accurate to: thickness—.001;  
width—.005, —.000, with all edges  
square to face within 10 minutes of  
a degree! 25 micro inch RMS finish  
or better!

## FREE

### Toolroom Wall Chart

Complete standard  
size listing of all air  
and oil hardening  
Precision Ground  
DoALL tool and  
Die Steel . . . send  
for it today!



Example: you need a 1" x 4" x  
18" piece of oil hardening steel.  
Remembering to order it oversize so  
you can grind away 1/16" scale  
and decarburizing on all surfaces, you  
specify Hot Rolled Steel 1 1/8" x 4 1/8" x 18"  
—\$18.84. You spend for grinding to size and  
overhead \$12.00 (2 hrs. @ \$6.00 per hr.). Total  
cost, \$30.84.

But, you can order the same piece, finished  
ground in Precision Ground Tool and Die Steel  
from DoALL for only \$24.13 and save \$6.71 . . .  
with no danger of rejections and no wasted ma-  
chining and labor time.

. . . and DoALL Tool and Die Steel:

Keeps ahead of scheduling . . . just ink it, mark  
it, cut it!

Is easier to machine . . . saws to any shape on  
a band machine!

Simplifies heat treating . . . non-deforming and  
distortion resistant!

Prompt delivery . . . over 1000 standard sizes . . .  
local stocks . . . fast delivery on special sizes!

Save money on your tool and die jobs . . . see  
your local DoALL Sales-Service Store or write for  
further information:

The DoALL Company, Des Plaines, Illinois

TS-165



**Band  
Saws**

Machines and Blades



**Surface Grinders**



**Power Saws**

Call Your **DoALL** Service-Store



**DoALL  
SAW  
BANDS**



**MEASURING  
INSTRUMENTS**



**SHOP SUPPLIES  
IN STOCK**

MACHINE TOOLS ..... CUTTING TOOLS ..... INSTRUMENTS ..... IN STOCK

For more data circle 421 on Reader Service Card



**new shop equipment . . .**

## **BEARING CONSTRUCTION EXTENDS DIE LIFE IN 75-TON FLEXOPRESS**

Prolonged die life—up to four times the average — is claimed to be made possible by the unique anti-friction ball-bearing raceway construction of

the new 75-ton automatic flexopress, built by Precision Welder & Flexopress Corp., Cincinnati, Ohio. The slide, with four preloaded ball-bearing raceways operating in hardened and ground steel inserts, maintains vertical accuracy within 0.0005 inch and parallelism between slide face and bed within 0.0015 inch. This extreme accuracy prevents misalignment between punch and die, the major cause of die wear in

**over 8,000 Different Selections  
For Immediate Delivery!**



**Quality-Famous, Heavy Duty  
AIR AND HYDRAULIC**

## **CYLINDERS**

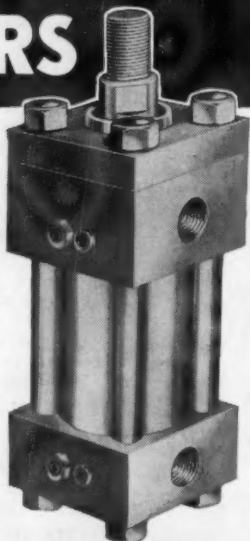
**now "in stock" for  
immediate shipment to you  
in popular sizes, mountings**

Eliminate costly production delays—speed-up your design and replacement programs—with this greatest quality selection ever offered on such fast delivery service.

**AIR CYLINDERS, 200 psi, 1½" through 8" bores, strokes up through 36", over 15 popular mountings, cushioned and non-cushioned.**

**HYDRAULIC CYLINDERS, 2000 psi, 1½" through 5" bores, strokes up through 36", over 15 popular mountings, cushioned and non-cushioned.**

Larger bores (up through 20" air, 12" hydraulic) and longer strokes (up to 22 feet) available on longer delivery.



**Write for Complete  
Data and Prices**



**MILLER FLUID POWER DIVISION**  
FLICK REEDY CORP.

**2024 N. HAWTHORNE AVE., MELROSE PARK, ILL.**

**CYLINDERS • BOOSTERS • ACCUMULATORS**  
*Sales and Service—From Coast To Coast*

conventional presses. High speed operation—up to 370 strokes per minute — is said to be made possible in the flexopress because of low ram inertia. Contributing to this low inertia is the lightweight aluminum - alloy ram construction, the anti-friction type bearings plus the double air cylinder counterbalance.

Large working capacity is provided with a 15 inch side opening accommodating work up to 14 inches wide. Automatic feed is infinitely adjustable up to 8 inches per stroke. The slide face measures 32 inches wide and 18 inches deep with a 2 inch diameter hole and a single knock-out. The 4 inch thick

For more data circle 422 on Reader Service Card



bolster, 36 inches wide and 30 inches deep, is removable. Stroke is standard 2½ inches. With slide in down position, maximum distance between slide face and bolster is 10 inches.

Hardened and ground double feed rolls have 360 degree cam lifters. The distance from the centerline of the rolls to the top of the bolster is adjustable from 4 to 5 inches and drive gear teeth are said to always be on pitch center, regardless of the material thickness. A scrap cutter is mounted integral with the feed rolls.

The electric control can be installed in a console, a pendant or a machine-mounted panel. The control provides single stroke, continuous operation, inching, variable top stop control, variable sequence inch control, key locking, motor reverse, motor start, emergency stop, variable motor speed, key locking stroke counter and a visible tachometer. Lubrication is continuous automatic force feed with a pressure switch electrically interlocked with the starting motor to assure proper oil pressure at all times. Automatic shutdown is provided in the event

of pressure failure. The machine frame is all steel, welded and keyed with tie-rod construction. Weldments are of heavy box-type design with convenient access provided to all points requiring normal service.

Other machine features include air friction clutch, mounted integral with the crankshaft; air-opened and spring-closed brake to provide automatic braking in event of electrical failure;



## STOPS PIPE THREAD LEAKS instantly!

### Prevents future leaks!

**TRU-O-SEAL** does away with messy pipe "dope" compounds, eliminates damage caused by overtightening of conventional leaky joints, and is immune to ALL known hydraulic fluids and to steam, air, water, solvents, and practically all gases and chemicals. It withstands temperatures from -100° F. to plus 500° F., saves cost and labor of special or welded fittings, and has been fully field tested and proven by leading manufacturers. Comes in ¼" to 2½" pipe thread sizes.

Write for data and prices



**DIVISION**  
Flick-Reddy Corporation

2024 N. Hawthorne    Melrose Park, Ill.

"Miller Fluid Power" is also a Div. of Flick-Reddy Corp.

**1** Thread **TRU-O-SEAL** on pipe or fitting (no messy pipe "dope" needed).



**2** Thread pipe or fitting 4 threads into part. Point in desired direction.

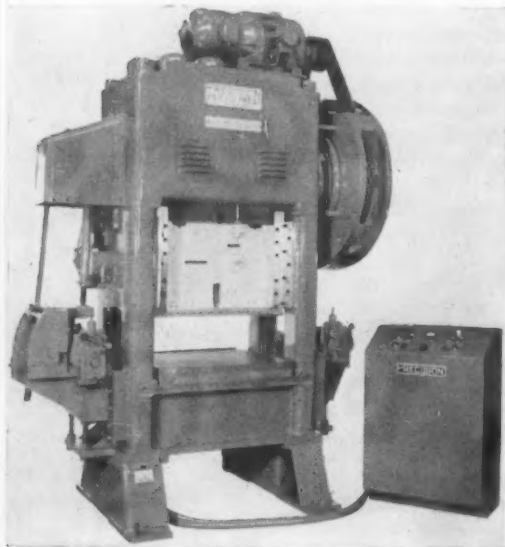


**3** Tighten **TRU-O-SEAL** to complete leakproof assembly (only light torque required).



For more data circle 423 on Reader Service Card

**new shop equipment . . .**



**View showing 75 Ton Automatic Flexopress**

10-h.p. Louis-Allis Adjusto-Spede Drive, 220/440 volts, 60 cycle, 3 phase, F.C.B.B., 1,675 to 100 revolutions per minute (other standard drives are optional); the weight of the machine is approximately 18,000 pounds.

For more data circle 106 on Reader Service Card

## **HIGH PRODUCTION CARBIDE**

Firth Sterling, Inc., 3113 Forbes St., Pittsburgh 30, Pa., has announced the latest addition to its line of special tungsten carbides. Called Firthite TXL, this carbide was created to meet modern requirements for cutting materials with predictably high performance characteristics. Grade TXL was designed specifically for the machining of steel from finishing cuts to the medium roughing range of operations.

For more data circle 107 on Reader Service Card

★ ★ ★

## **DUAL PURPOSE MARKING MACHINE MARKS BOTH STEEL AND PLASTICS**

A marking machine, engineered to such strength as to mark steel, stainless steel, cast iron and other metal products and parts, is now adaptable for the marking of plastic parts, products and materials with no change-over except slight adjustments. The plastics marking includes the marking of all thermoplastics and, in many instances, thermosetting plastics as well. The machine, introduced by The Acromark Co., 9 Morrell St., Elizabeth 4, N. J., is designated as the 1956 Model 9AH and it is driven by an air cylinder provided with foot or hand valve. In high production lines, this valve can be electrically controlled.

Standard stroke is 6 inches, but be-



***You Need an Extra Hand Now  
to Speed Up Production!***

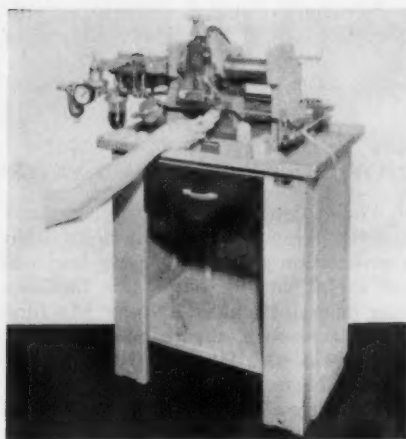
**HEIMANN TRANSFER SCREW SETS**

Here is the faster, more precise way of transferring open and blind screw holes—make savings in "wage-dollars-per hour" of your expensive hands on every job. A die-and-tool maker's tool with many other applications for die makers and machinists. A set of 6 Hardened Screws nested in combination holder and wrench—no other tools needed. Get more work now—save money too!

**IN 11 SIZES—No. 6 to 1" N.C. In all S.A.E. sizes.**

**HEIMANN MFG., CO. • URBANA, OHIO**

For more data circle 424 on Reader Service Card



**Acromark Model 9AH Marking Machine**

ing adjustable it can be reduced to meet any marking requirement. Long stroke models are also available. Up to 1,000 marks per hour can be produced

by this machine, depending upon the size of the part and the manner of feeding. The machine illustrated is shown being manually fed a cup shaped part of thermoplastic which is marked with calibrations and numbers in color. A positive feed and positive application of the mark insures perfection of marking beyond that attained by any other method.

The Acroleaf feed is automatic and a complete marking can be accomplished at each stroke of the press including the application of color. This machine is dual purpose in that by simply disconnecting an electric heating element and by stopping the tape feed, the machine is adaptable to the marking of similarly shaped parts of steel or other metals and by changing of the holding fixture it is promptly adaptable to the marking of innumerable sizes and shapes of parts.

Overall dimensions are approximate-



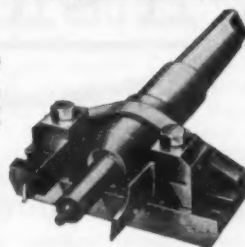
Specializing in Stainless Steel  
Standard and Made to Order Precision Parts  
Send Your Blueprints for Prompt Quotations

**PEASLEE METAL PRODUCTS CO.**  
470 Tolland St.  
EAST HARTFORD, CONN.

For more data circle 425 on Reader Service Card  
August, 1956

### Cut Costs on Hole-Cutting! USE THE NEW . . . **BOREMASTER**

Finished holes  
1 1/2" to 11 3/4"  
diameter to a  
depth of 8" on  
your present  
equipment.



BOREMASTER is not just another Trepanning Cutter, but a real heavy duty tool. Stock is removed in one piece eliminating waste. Remember . . .

TIME SAVINGS + MATERIAL SAVINGS  
= COST SAVINGS

• Write us today for complete details!

**NEISE**  
MODERN TOOLS

**KARL A. NEISE**  
404 4th Ave., Dept. MMS,  
New York 16, N. Y.

For more data circle 426 in Reader Service Card  
modern machine shop 253

### **new shop equipment . . .**

ly 30 inches left to right x 42 inches high x a depth of 22 inches. The power is provided by standard air line up to 150 p.s.i. The electric heating element plugs into any 110-220 volt socket.

For more data circle 108 on Reader Service Card

★ ★ ★

### **NEW CARBIDE PUSHER PADS**

Balas Collet Manufacturing Co., Cleveland 14, Ohio, has announced a new line of solid tungsten carbide pusher pads for its standard Model "A" Master Pushers. These pads are claimed to have a life expectancy of more than 30 times that of steel pads. Their bearing surface is non-scratching, non-wearing and non-galling. A

wide variety of standard sizes are available for use on practically all makes of machines.

For more data circle 109 on Reader Service Card

★ ★ ★

### **NEW CHASSIS FOR BAND SAWS**

The Kalamobile, a mobile band saw chassis for welders, workers in light construction and others using horizontal metal cutting band saw facilities has been introduced by the Machine Tool Division of the Kalamazoo Tank & Silo Co., 610 Harrison St., Kalamazoo, Michigan.

Utilizing the Kalamobile, complete mobility is now possible with the company's Model 610 series metal cutting band saws. They can be transported from job to job with unusual ease. The Kalamobile is available in two styles—Model M610D (dry) and M610W

## **Get the complete, revealing Inside Story...**

### **on the finest tapping heads ever made!**

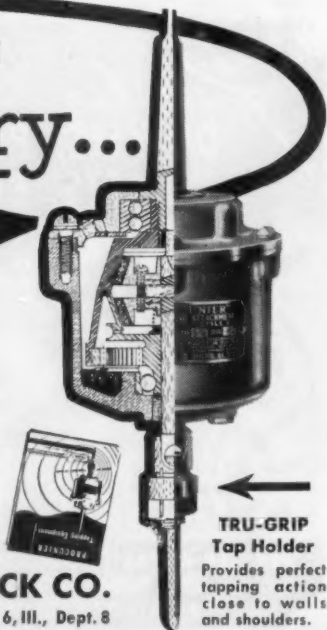
A complete feature by feature analysis on the amazing Procnier Tapping Line is yours for the asking! Shows the many outstanding construction improvements, mechanical advancements and precision quality operating advantages that make Procnier heads a "must" in production plants everywhere! You'll learn why Procnier means more tapping hours with minimum "down-time", faster production, with fewer broken taps, fewer spoiled pieces and a "new-found" operating ease that helps operators maintain stepped-up production schedules.

Write for **FREE Brochure** giving full details and specifications on the Procnier Line.

## **PROCUNIER SAFETY CHUCK CO.**

12 S. Clinton St., Chicago 6, Ill., Dept. 8

For more data circle 427 on Reader Service Card



**TRU-GRIP  
Tap Holder**

Provides perfect tapping action close to walls and shoulders.

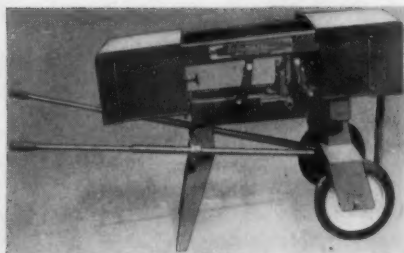


Illustration of Kalamobile Band Saw Chassis

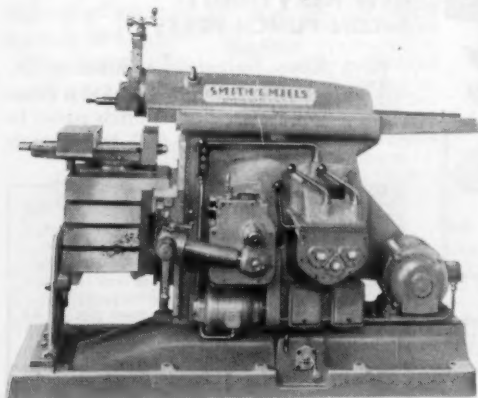
(wet). The Kalamobile chassis is available for mounting any Model 610 Band Saw now in service.

Sturdily built, the Kalamobile is still light enough for one man to move easily. The chassis, with its wheelbarrow principle, is rolled on 12 inch solid rubber-tired wheels. Collapsible handles are telescoped into the handle tubes avoiding objectionable interference when the machine is in operation.

★ ★ ★ ★ ★

## SMITH & MILLS SHAPERS

for production and tool room



Bull ram gear, rocker arm and universal table trunnion made of ductile iron for extra rigidity.

Compare Smith & Mills with any other shaper for versatility, speed, cutting power and precision performance. *Compare* and you'll *buy* Smith & Mills—famous for high quality shapers since 1888. Write or wire for prices, deliveries, repair parts or field service. Smith & Mills Shaper Division, Nebel Machine Tool Corp., 3409 Central Parkway, Cincinnati 25, Ohio.



For more data circle 428 on Reader Service Card

Handles are rubber gripped and utilize a half-way stop for an alternate degree of carrying leverage.

For more data circle 110 on Reader Service Card

★ ★ ★

## FACE GRINDER INCORPORATES MOTORIZED SPINDLE

A face grinder, now being manufactured by Abrasive Machine Tool Co., East Providence, R. I., is equipped with an 18 inch cup-shaped grinding wheel mounted perpendicular to the table and incorporates a motorized spindle that eliminates pulleys and belts and provides a simple, exceptionally powerful drive. The machine includes a 15 h.p., 900 r.p.m. heavy-duty motor. Box type construction provides maximum rigidity for accuracy in grinding any flat or square surface, as well as providing large bearing surfaces, easy maintenance and long life.



## new shop equipment . . .

At 900 r.p.m., the face grinder faces cold or hot rolled steel, tool steels, steel castings and all non-ferrous alloys. When used for grinding castings, it eliminates all milling or planing and requires less stock to be left on for finishing. This means that as much as



**TRUE POINT  
DRILL SHARPENER**  
for Drills 41 - 60 and  
61 - 80 R.H. & L.H.

A properly sharpened drill cuts faster — more accurately and is less likely to break.

Write for circular and full details.

**UP-TO-DATE TOOL CO.**  
P. O. Box 99, Station A, Worcester 8, Mass.

For more data circle 429 on Reader Service Card

# WALLS TU-WAY BELT SANDER

USE IT  
EITHER WAY




**VERTICAL**

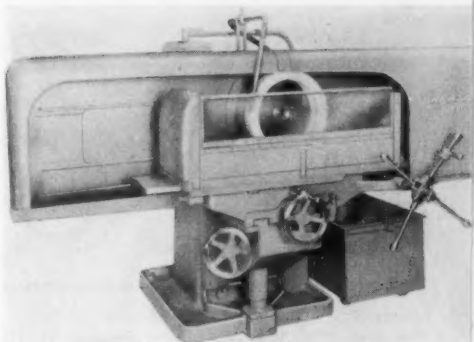
At last, a top quality industrial sander that provides all the most wanted features — yet sells for so little. **\$89.95**  
complete with cord, plug, switch ready to use

Illustrated Literature on Request  
A few desirable distributor territories still available.

**WALLS SALES CORPORATION**  
333 Nassau Avenue Brooklyn 22, N. Y.

For more data circle 430 on Reader Service Card

256 modern machine shop



View showing Abrasive 18 Inch Face Grinder

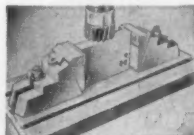
3/16 of an inch of stock can be saved on each surface. Applicable for any flat, square surface grinding job, the 18 inch face grinder is currently in use for grinding automobile dies, plastic moulding dies, molded insulated fire brick, ceramic insulators and all types of forging dies.

For more data circle 111 on Reader Service Card

★ ★ ★

## NEW HEAVY-DUTY 5-TON PUNCH PRESS

Alva Allen Industries, 1001-1005 N. 3rd St., Clinton, Mo., has added a completely new heavy-duty punch press to its line. The Model B-5, 5 ton punch



### MASTER GRIPPING CLAWS System Hubner WHY use them?

1. Clamping action Vertical as well as Horizontal—pressing workpiece down directly on the machine table. No hammering and still no air between.
2. Gain more working room.
3. Faster and more secure setups. Easier to handle.
4. Unlimited jaw opening.
5. No straps overlapping on the workpiece; more machining surface.
6. Extremely versatile—take light cuts or heavy cuts, use on small machines or heaviest production machines.

Exclusive Agents

**KARL A. NEISE**  
404 4th Ave., Dept. MMS,  
New York 16, N. Y.

**NEISE  
MODERNTOOLS**

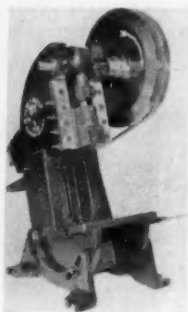
For more data circle 431 on Reader Service Card

August, 1956

press will perform up to 280 operations per minute on continuous punching, shearing, forming, riveting, blanking, cutting, drawing and other operations. The machine is claimed to be suitable for metal, plastics, textiles, or any workable material within its rated capacity.

A heavy 65 lb. flywheel assures ample power for heavy-duty operations. Combined with a ribbed frame, this combination is designed for rugged, efficient service. The upper connecting rod-ram assembly unitized for perfect alignment in conjunction with the heavy crankshaft and precision machined die bed. Connecting rod has large crankshaft bearing surface, lubricated through Zerk fitting for positive alignment and reduction of wear.

The ram can be easily adjusted for



**Allen Model B-5-Ton Punch Press**

die setting for standard wrenches. Six inch ram guides assure true alignment of ram with easily adjusted flat side gib for takeup wear. The new Allen synchronized, positive, single pin, repeat or non-repeat clutch is of simplified construction, containing fewer operating parts and designed to provide dependable service, according to the manufacturer.

For more data circle 112 on Reader Service Card

# 1200 <sup>3/4"</sup> TUBE ENDS PER HR.

## Deburred AND Faced

### ON PINES END-FINISHING MACHINE

At Tube Processing, Inc., Indianapolis, the Pines No. 600 End-Finishing Machine, illustrated at right, is today performing combination facing and inside and outside deburring operations on 3/4" x .035" x 15" steel tubes at average

net production rates of 1200 tube ends per hour. On smaller jobs, 1/4" and 3/16" steel tubes, net production averages up to 2000 ends per hour. The machine is equipped with air-operated clamp and foot pedal control.



#### Fast, Accurate Work

These outstanding performance records are typical of fast, accurate results achieved in other plants on all kinds of deburring, facing, chamfering, pointing, and reaming operations. This is because the machine is designed to clamp and feed work to the rotating cutters in one pass. This enables the operator to work more efficiently with less fatigue. Small and compact, the Pines No. 600 handles stock diameters up to 2". Maximum feed stroke is 1-1/4". Larger models for stock sizes up to 5" are also available.

**PINES** ENGINEERING CO., INC.

Specialists in Tube Fabricating Machinery 644 WALNUT • AURORA, ILLINOIS

PRODUCTION BENDING • DEBURRING • CHAMFERING MACHINERY

**FREE BULLETIN**

Write for facts on how these machines cut production costs.



For more data circle 432 on Reader Service Card

**new shop equipment . . .**

## **WISE PROVIDES QUICK SETUP FOR MACHINING OPERATIONS**

Chicago Tool and Engineering Co., 8399 S. Chicago Ave., Chicago 17, Ill., has announced the addition of the Palmgren No. 55 All Angle Vise to its complete line of machine vises. The

new Palmgren No. 55 All Angle Vise is said to provide a quick, easy setup for any machining operation that requires a simple angle or compound angle. Difficult compound angle milling, drilling, grinding, reaming and checking operations may be performed with an absolute minimum amount of time required for set-up. Work is held rigidly and vise can be securely locked in any position. The vise has three

separate adjustments for angle set-up. The swivel base is graduated 360 degrees for all horizontal positions. Vise may also be set at angle from 0 to 90 degrees on its side, and locked securely in position.

Vertical angles from 0 to 90 degrees may be obtained by setting the top hinged base in position and locking the support arm screws. Both the vertical and compound angle bases

## **how to trap dust**

*that damages  
your machines  
and hurts  
company morale*

Easy-to-move

**TORIT**

dust collectors trap dust  
at its source!



**Priced from  
\$190.00**

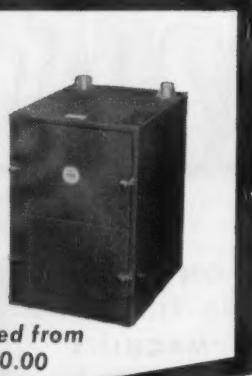
Untrapped dust costs money: "secretly" forces precision machines out of line, limits production. Torit dust collectors are unitized for custom installation—save more money, usually more efficient than central (built-into-building) system. Torit unit operates only when machine or combination of machines it protects are on. Filtered air may be returned to room to save heat. Many models and sizes, all self-contained, easy to move. Write today to . . .

**TORIT**

*manufacturing co.*

Dept. 701, 296 Walnut Street, St. Paul 2, Minn.

For more data circle 433 on Reader Service Card



**View showing Palmgren No. 55 All Angle Vise**

are graduated 0 to 90 degrees for quick set-up.

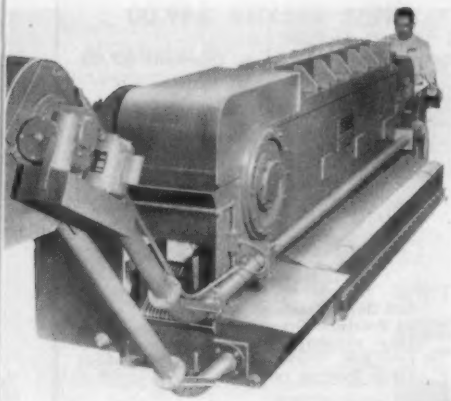
The all angle vise is claimed to be made of the highest grade grey iron castings obtainable and the jaw plates are ground steel. One jaw is plain and the other is grooved horizontally and vertically for holding round work. Compound angle base and swivel base are provided with lugs for bolting to machine table. Swivel base is also equipped with  $\frac{5}{8}$  inch keyway and keys for machine mounting. The vise is said to eliminate the need for special jigs and fixtures. The jaw width is 2½ inches, jaw opening is 2½ inches and the jaw depth is 1½ inches.

For more data circle 113 on Reader Service Card

★ ★ ★

## CONTINUOUS HORIZONTAL BROACHING MACHINE

A new heavy-duty horizontal continuous broaching machine has been announced by Detroit Broach and Machine Co., Rochester, Mich. Fixture locking, operation and unloading of the machine are fully automatic, while loading can also be done automatically when required. Long broach life and unusually fine finishes are said to be



Detroit Horizontal Broaching Machine

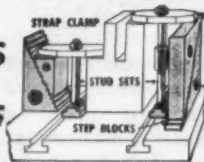
August, 1956

## SURE GRIP STEP BLOCKS STUD SETS

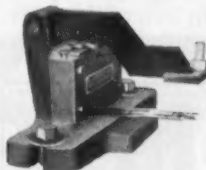
### STRAP CLAMPS

DEPT. SB-1

**TIETZMANN TOOL CORPORATION**  
ENGLEWOOD OHIO



For more data circle 434 on Reader Service Card



### New Low Cost AUTOMATIC SCRAP CHOPPER

3" wide \$69.00

6" wide \$95.00

12" wide \$195.00

Write for details

## JACO DEVICES, INC.

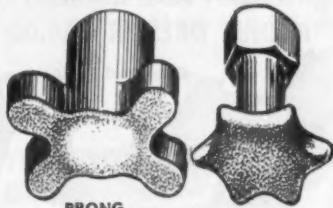
98 High St., Hingham, Mass.

For more data circle 435 on Reader Service Card

## REID

### TOOL ROOM ACCESSORIES

#### C. I. HAND KNOBS



PRONG

LONG SHANK  
With Wrench Hex.

As shown. Also Scal-  
loped Type. Fine grain  
cast iron. Smooth fin-  
ish. No sharp edges. Many sizes. Low prices.

**FREE 60 Pg. Cat.**

Describes numerous items needed in tool  
rooms. Top quality. Low prices.

**REID TOOL SUPPLY CO.**  
MUSKEGON HEIGHTS, MICHIGAN

For more data circle 436 on Reader Service Card

modern machine shop 259

## new shop equipment . . .

made possible because of the heavy, rigid construction of the machine. The frame is of all-welded, heavy steel plate construction. An oversize bull gear provides the positive pulling power, extra weight and smooth operation required for fine finishes. Easy, safe loading and unloading of a wide variety of work sizes and shapes is made possible by the extra fixture clearance, formed by the large radius from the

chain axis to the outer machine frame. A safety interlock device prevents operation until parts are positively positioned in the fixtures.

Cutting speeds up to 40 f.p.m. can be obtained from the heavy-duty twin chain electric-mechanical drive. Other speeds can be obtained through simple change gears. Fixtures are the hammer lock type, automatically located, locked, opened and emptied. The number of fixtures can be varied to meet almost any production requirement.

The machine is entirely self-contained, including the filtered coolant tank, pumps and automatic chip disposal unit, which is an endless conveyor. All electric and hydraulic equipment conforms to J.I.C. standards. The model illustrated has a 90 inch stroke with 15 ton capacity, and is approximately 60 inches high by 70 inches wide by 207 inches long, plus chip conveyor overhang. Other 15 ton models are being built with 66 inch stroke and 120 inch stroke, while lower and higher tonnage capacities are also available.

For more data circle 114 on Reader Service Card

# CAMS

MADE TO YOUR SPECIFICATIONS

—Except Screw Machine Cams—

Design Assistance Offered

KIDDE PRECISION TOOL CORP.

15 LOCUST AVENUE, ROSELAND, N. J.

For more data circle 437 on Reader Service Card

GET A BETTER "SURFACE GRINDER" JOB AT LESS COST!  
QUICKEST AND EASIEST SETTING TOOLS ON THE MARKET

**RADIUS DRESSER \$44.00**

**ANGLE DRESSER \$49.00**



Diamond \$7.00

**ORDER DIRECT**  
on our 10 day  
money back  
guarantee



Diamond \$7.00

### Chatter Resistant, Spring Loaded Spindle

Hardened shaft—bearing adjustable for wear.  
Diamond always perfectly centered.  
Easily set adjustable 180° stops.

10" Wheel size for DoALL and NORTON Grinders—\$49.00. Diamond \$7.00.

SPECIAL 20" Wheel Size \$110.00.

### Ball Thrust Bearing.

24 Precision Ground Surfaces. Can be set very accurately with a Protractor or Sine Bar. Works underneath the wheel. Large bearing surfaces.

### The "Mighty Midget" Line

SPERMAN METAL SPECIALTIES • 2199 E. 21st ST. • BROOKLYN 29, N. Y.

For more data circle 438 on Reader Service Card



## COUPLING ACCOMMODATES MILL MOTORS WITH TAPERED SHAFTS

A simplified, inexpensive mill motor type flexible gear coupling, that accommodates mill motors with tapered shafts, is offered by Sier-Bath Gear and Pump Co., Inc., 9247 Hudson Blvd., North Bergen, N. J. The mill motor type coupling has a sleeve and one hub of standard design, with the other hub taper bored to specification and a space provided for a nut on the end of the motor shaft. As with the standard flexible gear coupling, the overall size of the mill motor type is about three-fifths that of conventional couplings of the same shaft size and about half the usual weight. Horsepower capacity is greater than that of conventional flange - and - bolt types.

Mill motor flexible gear couplings



**Sier-Bath Flexible  
Gear Coupling**

are available in stock sizes  $\frac{7}{8}$  to 6, with capacities ranging from 4 to 600 horsepower-per-100 r.p.m. Special sizes and design modifications on request.

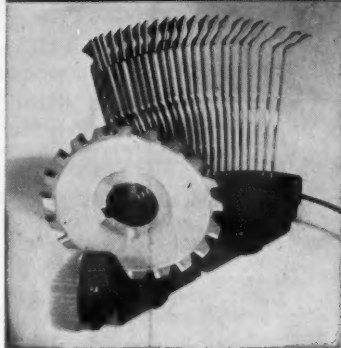
For more data circle 115 on Reader Service Card

★ ★ ★

## NEW AIR TYPE TOGGLE CLAMP

A new air-operated toggle clamp has been developed by the Detroit Stamping Co., 349 Midland Ave., Detroit 3,

**If You Can See It — You Can  
SAW IT with a GAY-LEE**



**Slotting typewriter type  
bar segment.**

**“THINSAW”**

Solve problems in high-precision slitting, slotting, sawing with Gay-Lee carbide-tipped Thinsaw! Wafer-thin for the most delicate work with positive alignment and rigidity that avoid run-out . . . but retaining the speed and long life of carbide. Patented construction holds tips firmly.



- **THIN AS .030"**
- **DIAMETERS UP TO 12"**

**Complete Line of Saws for Any  
Application—To Any Tolerance**

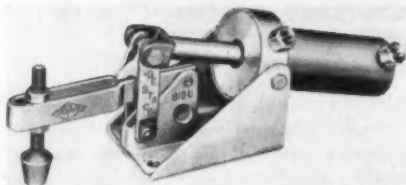
**WRITE FOR FULL INFORMATION**



For more data circle 439 on Reader Service Card

**new shop equipment . . .**

Mich. Known as the Clamp-omatic, this new air-operated Model 810 is said to be a more rugged, more compact unit providing positive, split-second clamping in multiple or single unit use. Only 12 inches long, 5 $\frac{3}{8}$  inches high and 3 $\frac{1}{4}$  inches wide, it requires less space than other clamps of this type.



**Detroit Stamping Air Operated Toggle Clamp**

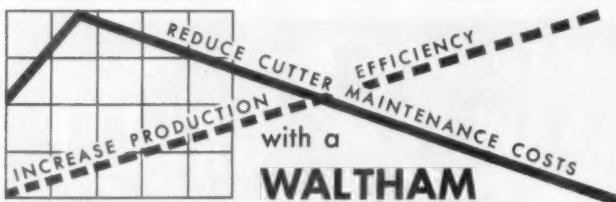
Model 810 is available in two sizes—Model 810-U, with U-bar for vertical

and lateral adjustment of pressure spindle and Model 810-S, with solid bar and bolt retainer. Several types of adjustment spindles are available.

All pivot points and the cylinder mounting base are equipped with hardened bushings. The toggle clamp has an expectancy of 400,000 cycles under normal operating conditions while the air cylinder has an expectancy of 3 to 5 million cycles. Air cylinder bore is 1 $\frac{1}{2}$  inches with a stroke of 2 $\frac{1}{4}$  inches and is fitted with two cylinder restrictor fittings to assure smooth cushioned clamping action.

Cylinder plunger is hard chrome-plated for long wear.

For more data circle 116 on Reader Service Card

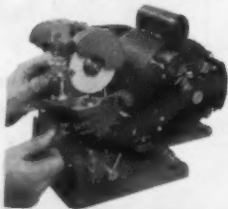


**CUTTER SHARPENING MACHINE**

**T**his self-contained machine does not require a skilled operator to grind cutters of small diameter which are sharpened by grinding the face of the tooth.

**Check these outstanding WALTHAM qualities:**

1. A dulled cutter may be sharpened and returned to service in less than 5 minutes.
2. This machine may be adjusted to grind positive or negative rakes as well as radial, changing quickly and accurately from one to the other.
3. Being portable this efficient machine may be located in the department where cutters are being used, thus cutters may be sharpened and returned to service immediately. Systematic sharpening by the WALTHAM method minimizes the reduction of the cutter diameter. This eliminates costly adjustments necessary to re-establish the basic work dimensions.
4. In two minutes, the cutter, arbor and index may be changed to accommodate cutters having different hole diameters and different numbers of teeth.



Send today for Bulletin No. 352

**WALTHAM**

**MACHINE WORKS, INC.**  
High Street, Waltham, Mass.

For more data circle 440 on Reader Service Card

## NEW SCALE TEMPLATES FOR TOGGLE CLAMPS

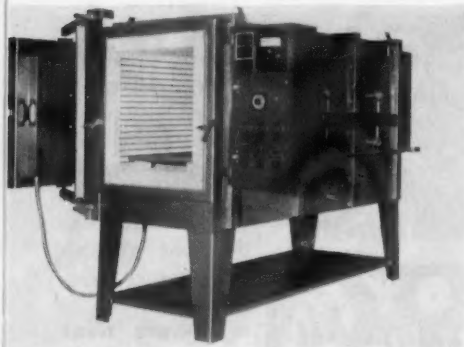
West Point Mfg. Co., 26935 W. Seven Mile Rd., Detroit 19, Mich., has announced  $\frac{1}{4}$  and  $\frac{1}{2}$  scale template sheets for all Wespo toggle clamps, in addition to full scale templates now in use. These reduced size templates are convenient for use on  $\frac{1}{4}$  and  $\frac{1}{2}$  scale drawings of large parts. The manufacturer will furnish templates on request. For more data circle 117 on Reader Service Card

★ ★ ★

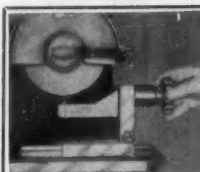
## HEAT-TREATING FURNACE PROVIDES FOR CLOSELY CONTROLLED TEMPERATURES

The L & L Manufacturing Co., 136 Eighth St., Upland 71, Del. Co., Pa., has announced a new furnace, designed for many critical temperature heat-treating operations such as annealing large intricate assemblies of laboratory glass, production heat-treating metal, and so on, where furnace gradients must be controlled closely.

The interior dimensions of this furnace, designated as the Model No. P2472-1 Special, are 24 inches wide x 24 inches high from hearth to roof and 72 inches long. Not only is



L & L Model P2472-1 Heat-Treating Furnace



At new low price \$124.50  
with diamond.

**SOMERSET TOOL CO.**

## NEW 1956 MODEL "SS" RADIUS DRESSER

outperforms them all  
Cut production time  
without sacrificing accuracy! Easy to set, easy to see, eliminates necessity of guard removal  
Somerset Radius Dresser turns "tricky" jobs into routine operations

Write for free  
illustrated folder.

320 Virginia St.  
Hillside, N. J.

For more data circle 441 on Reader Service Card

## HARGRAVE CLAMPS

A Complete Line of Clamps for all Purposes

Individually  
Power Tested  
for Better  
Performance



"C", Steel Bar,  
Quick Acting,  
Wood Hand  
Screws, Welders

### WRITE FOR FREE CATALOG.

Showing Clamps, Chisels, Punches, Masonry Drills for hand and power hammers, Carbide Drills, Washer Cutters, and File Cleaners.

Stocked by Your Local Distributor.

**THE CINCINNATI TOOL COMPANY**

1947 Waverly Ave., Cincinnati 12, Ohio

For more data circle 442 on Reader Service Card



**FLEXIBLE  
POWER  
STRAIGHTENING  
PRESSES**

WITH

**AIR CONTROLLED CLUTCH**

- SLASH TIME
- INCREASE PARTS PER HOUR
- MAKE MONEY

*General Mfg. Co.*

6433 FARNSWORTH  
DETROIT 11, Mich.

For more data circle 443 on Reader Service Card

## **new shop equipment . . .**

temperature evenness easily attained, but different temperatures in different parts of the furnace are easily controlled and indicated by means of the thermocouple selector switch. There are six zones in the furnace; the input to each is controlled by an input con-

troller which may be set from 7 to 100 per cent of input in increments of 1 per cent, giving precise control over the rate of heating in that zone. Any rate of heating up time may be selected, thereby enabling control over product uniformity.

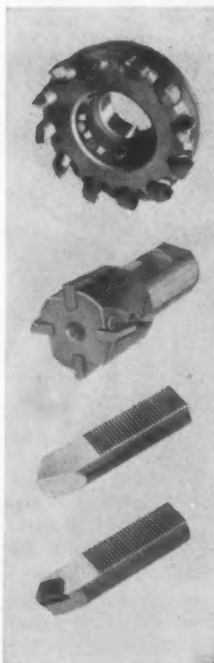
Completely automatic control is attained by a unique combination of temperature controller with "straight line"

adjustments and a precise thirty hour timer. The temperature controller upon its first impulse at the control point starts the timer on its timing out cycle. When the timer has "timed out" the furnace is automatically shut off. At this point variable cooling off may be selected by setting the controller to the desired rate.

The elements are supported by means of specially designed "Dyna-Glow" element holders. These element holders have excellent heat transfer properties. A low mass characteristic keeps overshoot and undershoot of the temperature control point, due to minimum heat storage in the element holders, to

***Look into the complete, cost-cutting LOVEJOY line.***

***Standard tools are in stock - to help you increase production, save time and money now!***



### **INSERTED-TOOTH MILLING CUTTERS**

Face, side, end, slotting and boring mills.

### **H. S. S., CARBIDE, ALLOY BLADES**

Interchangeable in all Type "A" milling cutters from 4½" to 24" in diameter.

### **NEW! SET-SCREW TYPE END MILLS**

And new Type "Z" slotting cutters provide maximum axial and radial adjustment.

**Boring Tools • Arbors • Flywheels  
Lovejoy Milling Cutter • Assembly Gage**

### ***Special cutters are a Lovejoy specialty***

Write for new catalogs: No. 31 (Face Mills), No. 32 (Side Mills), No. 33 (Arbors).

130 MAIN ST., SPRINGFIELD, VERMONT

**Send for free  
SPEED & FEED  
CALCULATOR**

**LOVEJOY**  
**TOOL COMPANY, INC.**



SPRINGFIELD, VERMONT, U. S. A.

For more data circle 444 on Reader Service Card

an absolute minimum. Excellent element support and easy element replacements are other "Dyna-Glow" element holder features.

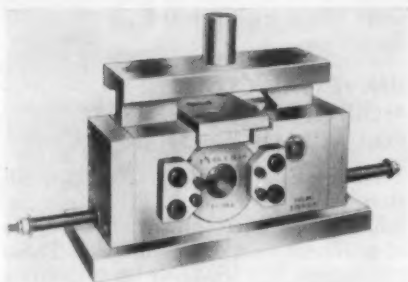
For more data circle 118 on Reader Service Card

★ ★ ★

## PIPE AND TUBE NOTCHER LEAVES CLEAN EDGES

Cleaner cutting, accuracy of alignment and greater speed in notching pipe and tubing are claimed for the new Arc-Twin by its manufacturers, Vogel Tool and Die Corp., 1825-6 N. 32nd St., Melrose Park, Ill. Cutting from the inside out, the Arc-Twin leaves clean edges that are said to require no further finishing. Perfect 180 degree alignment of punch cuts two identical notches with each downstroke of punch press—an operation that takes two or three seconds.

On a conservative hourly basis, ac-



View of Arc-Twin Tube and Pipe Notcher

cording to the manufacturer, six hundred pipe ends per hour can easily be double-notched with this notcher. From a cost standpoint, this means a saving up to as much as 30 cents per piece, as compared with other notching methods such as milling or flame cutting. Figures show that 30,000 pieces may be notched before unit requires any attention or sharpening.

For more data circle 119 on Reader Service Card

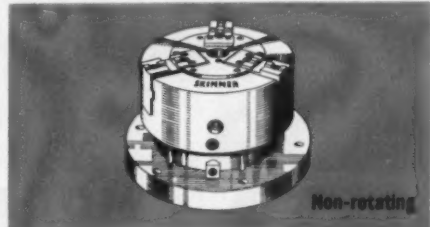
...combines  
accuracy, speed  
and power!

**SKINNER**  
POWER CHUCK  
FIXTURE



THE CREST OF QUALITY

THE **SKINNER**



*The lowest, most compact unit of its kind!*  
It's air-operated, durable — ideal for drilling, milling and transfer machines, and for assembly operations.

Wedge action provides tremendous gripping power. Self-centering, self-locking. Available in 8", 10" or 12" dia., with 2 or 3 jaws. Operable with Skinner hand valve or foot valve; 3/8" pipe connections. Maximum air pressure: 100 lbs.

Write Skinner or your Skinner distributor for folder.

**CHUCK COMPANY**

210 Edgewood Ave., New Britain, Conn.

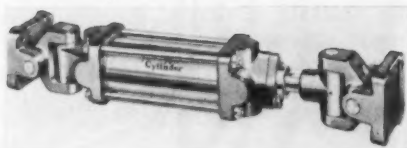
For more data circle 445 on Reader Service Card



**new shop equipment . . .**

### **UNIVERSAL CYLINDER MOUNTINGS COMPENSATE FOR MISALIGNMENT**

Hanna Engineering Works, 1758 Elston Ave., Chicago 22, Ill., has announced the development of two types of universal cylinder mountings. These mountings are claimed to eliminate



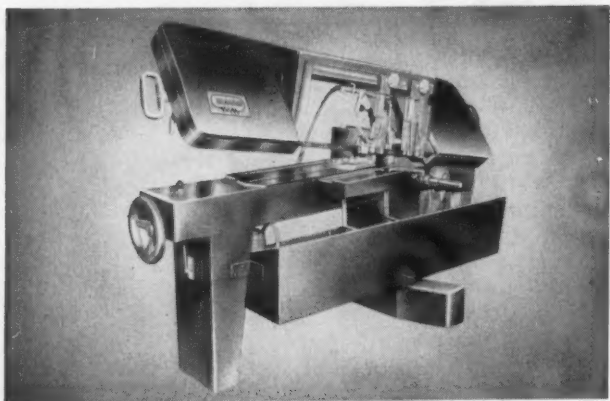
*View of Hanna Universal Cylinder Mounting*

problems due to misalignment between cylinders and their loads, thereby reducing costs associated with breakage of mechanical devices and cylinders. The universal mountings are available in two forms: a hinge mount cylinder with universal mounting brackets at each end, illustrated in the photo; and a cylinder with universal trunnion and universal mounting bracket for the rod end.

Common applications for cylinders with universal mountings include the operation of hopper gates, elements rotating about shafts such as gear segments and levers, and objects moving on wheels or tracks such as trucks or transfer tables. They also compensate for deflection and misalignment.

For more data circle 120 on Reader Service Card

### **FIRST 8-INCH METAL CUTTING SAW TO MEET TODAY'S NEEDS**



**KALAMAZOO**

### **MODEL 8C**

**cuts 8" round, 16" flat, 8" pipe**

Instant-acting vise holds work-piece. Four speeds for best cutting. Accuracy easily controlled—blade action in cut easy to see. Blades changed in seconds. Automatic shut-off. All parts readily accessible. Ask your Kalamazoo dealer to demonstrate Model 8C.

Kalamazoo Metal Cutting Band Saw Machines:

**KALAMATIC BAR FEED** for Kalamazoo.

**MODEL 1220** cuts 12" round, 20" flat.

**MODEL 610** cuts 6" round, 10" flat.

MACHINE TOOL DIVISION

**Kalamazoo TANK and SILO CO.**

810 HARRISON STREET

—

KALAMAZOO, MICHIGAN

For more data circle 446 on Reader Service Card

## REAMER WITH INTER-CHANGEABLE HEAD

A new-type reamer that "replaces only the part that wears out," thus cutting replacement cost to less than half, has been introduced by The Tomkins-Johnson Co., Jackson, Mich. This new reamer is designed so that only the quickly installed head needs replacing, after buying original shank. The tapered hole in the head insures concentricity, while the new thread design assures a snug fit on the smoothly ground tapered shank. Head and arbor are firmly locked together. Heads can be quickly and easily changed when dull, or for work on different metals to increase efficiency. Thus, if the work is changed from steel to bronze, it is a simple matter to put on a sharp new head and eliminate sticking which occurs when a reamer dulled by steel is used in bronze. The reamer operates free from binding or sticking due to cutting portion wearing undersize and creating negative relief.

A wide range of interchangeable heads is available

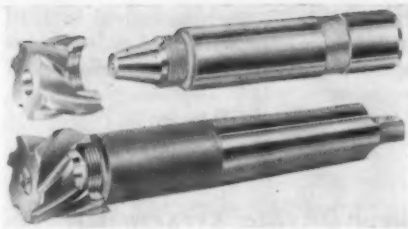


Illustration showing Tomkins-Johnson Reamer

## LUBRICATION ECONOMY

### "THIS LUBRICANT EXTENDED BEARING LIFE 50%"

says REPUBLIC AVIATION CORP.

**ALSO MAKES CARS AND TRUCKS RUN BETTER AND LAST LONGER**



LUBRIPLATE H.D.S. MOTOR OIL... THE OIL THAT NEEDS NO ADDITIVES



... "It was also found that, during test, LUBRIPLATE increased efficiency of machines twenty per cent by reducing friction loss. Republic has been using LUBRIPLATE Lubricants successfully for the past eight years."

1. LUBRIPLATE reduces friction and wear.
2. LUBRIPLATE prevents rust and corrosion.
3. LUBRIPLATE is economical to use.

Write today for case histories of savings made through the use of LUBRIPLATE in your industry.

**LUBRIPLATE DIVISION**  
Fiske Brothers Refining Co.  
Newark 5, N.J.—Toledo 5, Ohio

*The Different LUBRICANT!*

DEALERS EVERYWHERE, consult your Classified Telephone Book

For more data circle 447 on Reader Service Card

from 1/2 to 3/4 inch inclusive, in 1/16 inch increments with right or left-hand spiral flutes for through or blind hole reaming.

For more data circle 121 on Reader Service Card

★ ★ ★

## NEW MILLING ATTACHMENT

The Model VS-4 1 h.p. milling attachment has been announced by the

Duff Machine Co., 31 Wingate St., Haverhill, Mass. This attachment is featured on the company's ram turret vertical miller and has variable spindle speeds from 85 to 3,000 r.p.m.

Ease of operation is a keynote of this device. All the operator has to do is engage or disengage back gears and dial speed wanted. A three speed power feed to quill and spindle brake are included.

This milling attachment is fully uni-

versal, rotates 360 degrees around face of ram and 45 degrees in or out across table. All ways and surfaces on the machine are ground and hand scraped. Tapered gibs and large bevel dials are also featured on this new vertical milling attachment for fine adjustment readings and accuracy.

For more data circle 122 on Reader Service Card

**FREE BOOKLET**  
see how diamond  
can cut your finishing  
costs... how to use  
diamond most  
economically.

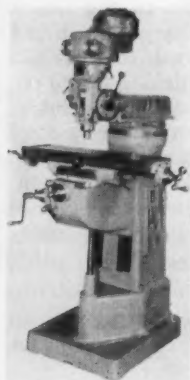
**ELGIN Diamond**  
... another famous for quality ELGIN Product

Precision graded in Elgin's own laboratories and scientifically compounded for maximum abrasive efficiency... recognized as the standard for diamond abrasive quality. Elgin Diamond saves hours of finishing time more precious than diamond itself. Write today for your copy of "Finish with diamond—ELGIN DIAMOND".

**ABRASIVE DIVISION, DEPT. P**

**ELGIN NATIONAL WATCH COMPANY**  
ELGIN, ILLINOIS

For more data circle 448 on Reader Service Card



**Duff Model VS-4  
Milling Attachment**

## COMBINATION PEDESTAL HONING MACHINE AND COOLANT UNIT HAS IMPROVED DESIGN

A new and improved design of the combination pedestal Model JCP honing machine and coolant unit has been announced by Superior Hone Corp., 1615 Elreno St., Elkhart, Ind. The new features include the enclosure of the coolant unit in the base, an increase in capacity to 10 gallons, a larger expandable coolant tray working surface, and a vee-belt drive. It has a honing range from 0.120 to 2.500, without adapters.

Spindle speeds are variable from 400 to 1,000 r.p.m. without changing belts. Mandrels or stones can be changed without



**Superior Model JCP  
Honing Machine**

the use of tools. All mandrels fit the spindle with a bayonet lock. The counter balanced foot pedal is adjustable to any desired pressure. The flexible coolant hose can be accurately aimed at any point. The nozzle is adjustable to an oil flow that exactly fits the needs of any job. The entire machine is finished in baked enamel, for durability. For more data circle 123 on Reader Service Card

## LAMINUM® SHIMS

**SIMPLY PEEL FOR ADJUSTMENT**



Laminated shims provide great accuracy with easy, economical machining tolerances. This simple method of spacing adjustment reduces lathe time, eliminates stand-

by machines. Adjustments in thousandths are made right at the job with a penknife. You eliminate the counting, stacking and mixing of ordinary shim procedure.

**SEND TODAY for our Engineering Data File**



3308 UNION STREET, GLENBROOK, CONN.

For more data circle 449 on Reader Service Card

**new shop equipment . . .**

### **AUTOMATIC LADLING UNIT FOR ALUMINUM**

A new automatic ladling unit for aluminum, which makes possible fully automatic processing of many types of castings, especially aluminum die casting and permanent mold, is being of-

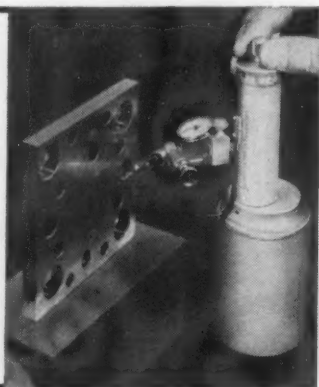
fered by the Lindberg-Fisher Division, Lindberg Engineering Co., 2469 W. Hubbard St., Chicago 12, Ill. The unit is manufactured entirely of special refractory materials and is so arranged that the molten metal being ladled cannot come in contact with any metal structure. The basic pump has no moving parts, check valves or other devices. The automatic ladling unit operates on the principle of a pressurized chamber.

The size of the shot depends upon both the time of pressure application and the pressure. The unit is so designed that ladled metal is conveniently withdrawn from beneath the surface of the bath.

There is a wide latitude in the ladling range and it can be instantly and accurately adjusted to vary the size of the shot. The equipment is normally supplied to cover the range of 1 to 10

### **CUT INSPECTION TIME!**

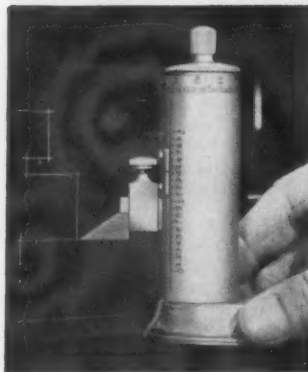
Micro-Height Gage reads faster than a micrometer! You measure from zero at base to 3", Hundredths on barrel... *thousandths* on big head that cuts reading time. Add dial indicator to quickly measure between holes, surfaces.



### **GREIST MICRO-HEIGHT® GAGE**

### **CUT LAYOUT TIME!**

Easy-reading Micro-Height measures and scribes faster than any vernier gage...with less chance of error! Risers give you ranges to 9". Accurate Micro-Height, finished in satin-chrome, quickly pays for itself!



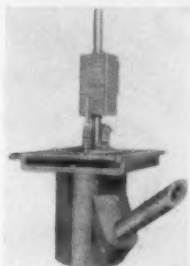
*Call your distributor or write.*

THE **GREIST** MANUFACTURING CO., 498 BLAKE ST., NEW HAVEN 15, CONN.

**Precision Products since 1871**

For more data circle 450 on Reader Service Card

270 modern machine shop



**View of Lindberg  
Automatic Ladling  
Unit for aluminum**

August, 1956



lb. of aluminum; other sizes of shots in aluminum or other metals are also available. Precise, accurate control of any size shot within its range is said to be provided with no interruption of the casting cycle during charging of metal. The unit is adaptable to electric furnaces or fuel fired reverberatory furnaces with no variation of size of shot due to metal level variation.

For more data circle 124 on Reader Service Card

★ ★ ★

## SETTING PLUG GAGE

To fill the need for a more readily available measuring tool which can indicate extreme accuracy in ring gages, Besly-Metro Division, Besly - Welles Corp., Dept. TSP, 108 Dearborn Ave., South Beloit, Ill., includes a stock item in its catalog called a Besly - Metro Truncated Setting Plug Gage. Truncated type "Go" and "No Go" threaded members establish the correctness of new ring gages and the presence of wear in used thread rings. Truncations extend one-half the length on the major diameter of both members. The remaining portions are full-form. The pitch



Besly-Metro Truncated Setting Plug Gage

diameter is constant for the full length of each member. Tolerance of pitch diameter is minus on the "Go" and plus on the "No Go." In use, the ring gage is first set to the full form portion of

*"Get them from Gillen"*

### MACHINE KEYS

Standard Gib Head and Plain Taper Keys, Straight and Round End Feather Keys. Precision milled, C-1018 Steel; close tolerances; completely de-burred, ready for assembly.

Send for



MK  
Catalog

### MACHINE PARTS

Every shape and size; milled, drilled, tapped, countersunk, counterbored, heat-treated, surface ground, from various metals. Used by leading machinery builders. Precision made, rigid inspection.

Send for



MP  
Catalog

### KEYS • PARTS • PINS

### GILLEN GROOVE PINS

Just drill hole, Drive in pin. 3 grooves compress pin for tight fit. Stocked many lengths and diameters. For fast, production fastening. Eliminate threading, tapping, reaming. Various metals and finishes.

Send for



GGP  
Catalog

### TAPER PINS

Straight to taper, 1/4" per foot. Extremely accurate. Milled from bar stock; also centerless ground. Rust-resistant coating. Stocked many lengths and diameters.

Send for



TP  
Catalog

*John Gillen Company*

Manufacturers

2542 S. 50th Ave., Cicero 50, Illinois

For more data circle 451 on Reader Service Card

## new shop equipment . . .

the setting plug for accuracy, then by moving the ring gage on to the truncated section of the plug it will instantly check for wear or correctness at the pitch diameter. The tool is designed to measure sizes ranging from No. 0 to 1½ inch.

For more data circle 125 on Reader Service Card

## TAPS 6-¼" HOLES IN A COOL 14 SECONDS! AND TAPPED 6000 HOLES JUST AS QUICKLY WITHOUT CHANGING TAP



The rings were malleable iron castings. The holes were tapped to a depth of ½ inch at 1700 R. P. M.



Hardly seems possible . . . yet this and other equally amazing tooling operations are becoming an everyday occurrence in plants equipped with the new Mistc Mist method of cooling tools. Compressing air generates heat . . . expanding air absorbs heat. Add this to the evaporation of moisture and movement of air and you will understand why the application of mist is the most effective, practical and cleanest method of cooling all metal working processes. Mistc Mist is the most economical and efficient mist generating system available . . . requires no special coolant. Systems available for as low as \$30.00.



Coolant  
Mist  
Generators

WRITE TODAY FOR COMPLETE  
INFORMATION



**AETNA MFG. Co.**  
193 SO. YORK ST.,  
BENSENVILLE, ILL.

For more data circle 452 on Reader Service Card

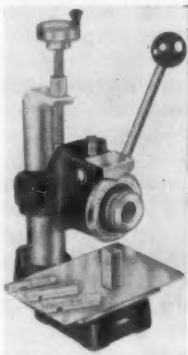
## PARTS MARKING PRESS

The Clearview Co., 172 Stanton St., New York, N. Y., has announced a new parts and tool numbering machine. The device is said to mark cleanly and avoid the tedious job of marking items by hand stamping operations. After the part has been clamped on the table, the rest of the procedure is all mechanical. The character dial marks part when the handle

is pulled forward. The device is similar in operation to a typewriter. After each stroke the table spaces automatically in position for the next character. Impression depth is controlled by a stop at the top of the machine.

The press has table dimensions of 8 by 10 inches and a throat depth of 4 inches. It stamps parts from 1/32 to 4 inches.

For more data circle 126 on Reader Service Card



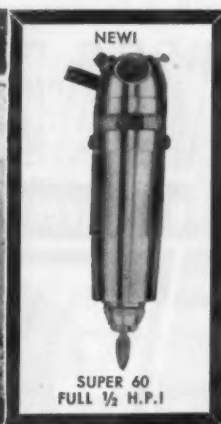
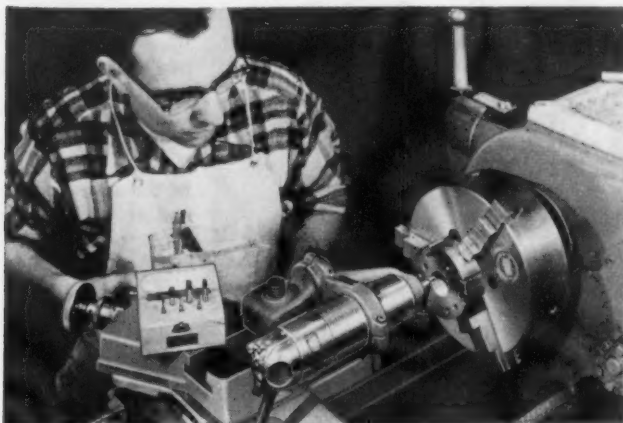
View of Clearview  
Parts Marking Press

## 200 GALLON MAGNETIC SEPARATOR AND FILTER FOR SLUDGE AND ABRASIVES

A Delpark 200 gallon magnetic separator and filter is now available from Industrial Filtration Co., Dept. 200-294, 13 Industrial Ave., Lebanon, Ind., for filtration processes requiring large flow capacities.

Claimed to be the largest device of its kind manufactured, this unit is

unique in the removal of sludge and abrasives by the use of a flat magnetic field of Alnico No. 5 permanent magnets. The ferrous laden liquid flows over this magnetic field, diffusing liquid and particles; thus assuring complete exposure to the magnets. Such diffusion automatically doubles the magnetic field, making possible the liquid depth being held to a minimum. Particles, which would normally remain suspended in heavy viscosity li-



## the POWER QUILL outperforms, outlasts the outmoded lathe grinder!

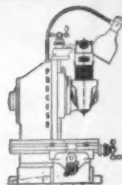
The Precise Power Quill is a small powerful high precision tool that outperforms and outlasts old fashioned lathe grinders, yet the Power Quill costs less! It can be mounted on any standard machine tool to mill, grind, or finish to tolerances of .0001". Operates at speeds up to 45,000 RPM, develops up to 1/2 H.P. and works on any material with abrasive wheels or tungsten carbide tools.

Attach this ad to your letterhead for a free demonstration or literature!

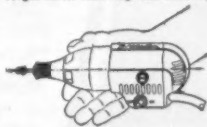
### PRECISE PRODUCTS CORPORATION

1345 CLARK STREET, RACINE, WISCONSIN  
Quality and Precision since 1882

Power Quills, Portable Electric Grinder Millers, High RPM Milling Machines, Milling Machine Accessories, Speed Lathes, Commutator Slotters, Grinding Tools, Rotary Tools, Carbide Tools.



High RPM Milling Machines.



Super 30  
Grinder Miller

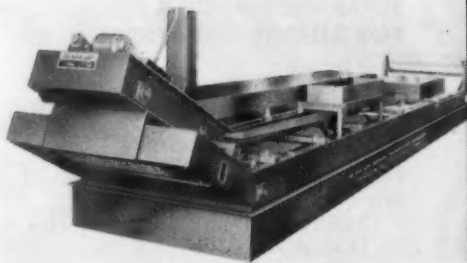
*Precise*

For more data circle 459 on Reader Service Card

## new shop equipment . . .

quids, are brought into more positive influence of the magnets. Assisted by the natural force of gravity and low velocity flow, efficient separation of ferrous sludge and abrasives is said to be assured.

Certain particles, such as wheel abrasives, do not respond to a magnetic field. For maximum efficiency, Del-



**Delpark Magnetic Separator and Filter**

# WALKER

and a great industry



For more than fifty years automotive production has relied on Walker holding devices. One of the most popular chucks in the Detroit area is Walker 617 CG (concentric gap) type, a rectangular chuck that combines longitudinal and transverse gaps. Produced in sizes to meet all holding requirements.

Walker engineers can solve any holding problem.  
What is yours?

## O. S. WALKER CO. Inc.

WORCESTER 6, MASSACHUSETTS

*Original Designers and Builders of Magnetic Chucks*

For more data circle 454 on Reader Service Card

park has combined the magnetic separator with the Delpark paper filter. Particles remaining in the liquid after contact with the magnetic field, pass down to the filter material which rests on a flat endless conveyor. The liquid filters through this material by gravity and the particles remain on the surface forming an efficient filter bed. Constant sludge removal is effected by the use of automatic chain-driven, rubber-bladed flights which carry the sludge up a ramp and then deposit it into a tote box for disposal.

Delpark Magnetic Separators are also available without the com-

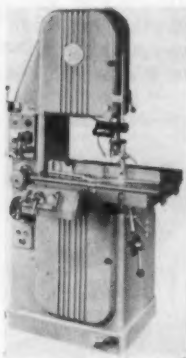
bination paper filter feature in capacities ranging from 5 gallons per minute to 200 gallons per minute.

For more data circle 127 on Reader Service Card

★ ★ ★

## CONTOUR CUTTING MACHINE HAS VARIABLE SPEEDS

Aaron Machinery Co., Inc., Dept. M, 45 Crosby St., New York 12, N. Y., has introduced the new Kolle Model K-16 vertical cutting bandsaw. This contour cutting machine has infinitely variable cutting speeds from 33 to 2,400 feet per minute; for sawing, filing and polishing; with a table that swivels 15 degrees on all four sides. Other features include hydraulic attachment for infinitely variable feeds, all welded steel construction, illuminated mag-



Kolle Model K-16  
Vertical Bandsaw

nifier, both welder complete with grinding wheel, blade shear and circle cutting attachment.

For more data circle 128 on Reader Service Card

★ ★ ★

## NEW PRECISION CLINOMETER

An improved type of precision clinometer, for effective use wherever inclinations have to be read to great accuracy, has been introduced by Engis Equipment Co., 431 S. Dearborn St.,

Check FIRST with CHALLENGE®  
WHEN YOU NEED

# PRECISION SURFACES FOR LAYOUT, INSPECTION & ASSEMBLY

- |  |  |   |
|--|--|---|
| <input type="checkbox"/> Semi-Steel<br>Layout Surface<br>Plates    | <input type="checkbox"/> Bench Plates            | <input type="checkbox"/> Universal Right<br>Angle Irons |
| <input type="checkbox"/> Black Granite<br>Layout Surface<br>Plates | <input type="checkbox"/> Lapping Plates          | <input type="checkbox"/> Angle Plates                   |
| <input type="checkbox"/> Reading Tables                            | <input type="checkbox"/> Bench Blocks            | <input type="checkbox"/> Universal Box<br>Angles        |
| <input type="checkbox"/> Checking Tables                           | <input type="checkbox"/> Straight Edges          | <input type="checkbox"/> Box Parallels                  |
| <input type="checkbox"/> Adjustable<br>Floor Plates                | <input type="checkbox"/> Surface Plates          | <input type="checkbox"/> V-Blocks                       |
|  | <input type="checkbox"/> Surface Plate<br>Stands | <input type="checkbox"/> Cast-Iron<br>Work Benches      |



**THIS CATALOG**  
.... shows the  
complete Challenge  
line of  
Precision Sur-  
faces—all types,  
all sizes. See it  
before you buy  
any surface  
equipment.

SE-101

Challenge

TRADE-MARK ®

MMS-8

**THE CHALLENGE MACHINERY COMPANY**  
GRAND HAVEN, MICHIGAN

Send complete Challenge Precision Equipment  
catalog. Include information on the items  
checked above.

Name \_\_\_\_\_ Title \_\_\_\_\_

Company \_\_\_\_\_

Address \_\_\_\_\_

For more data circle 455 on Reader Service Card



## new shop equipment . . .

Chicago 5, Ill. Known as Type TB95, the instrument is equipped with a new optical system reading directly to 1 second of arc. It features a fully enclosed bubble, optical bubble-reading system repeating to 1/2 second, daylight as well as electrical bubble illumination and sensitive new bubble adjustment.



**"Jorgensen"**  
and **"Pony"**  
**CLAMPS**

**ASK YOUR SUPPLIER.**  
send for free catalog.

**ADJUSTABLE CLAMP CO.**  
the clamp folks, 436 N. Ashland, Chicago 22, Ill.

For more data circle 456 on Reader Service Card

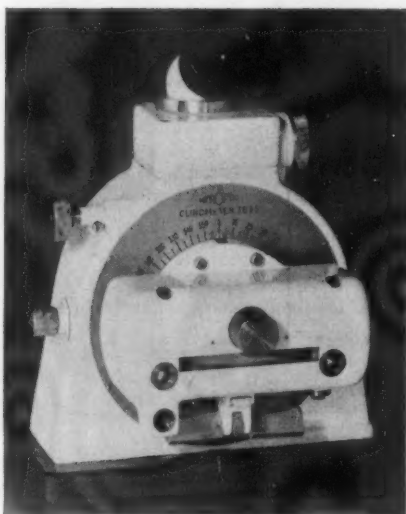
### HAND KNOBS



**6 SIZES CAST-IRON**  
Tapped, Reamed  
or Blank  
Hex-shaped hub for  
extra tightening

Write for catalog  
**TIETZMANN TOOL  
CORPORATION**  
DEPT. HK-1 • ENGLEWOOD, OHIO

For more data circle 457 on Reader Service Card



Engis New, Improved Precision Clinometer

The instrument retains the features of the Standard Precision Clinometer TB101, which provides direct reading to 10 seconds with guaranteed accuracy of 5 seconds.

The entire leveling unit of the new clinometer can be removed and replaced by a table, workholding fixture or mirror attachment. It then becomes a versatile tool for testing circular spacing on gears, cams and other precision parts, as well as a universal testing device when used with the Watts Micropitch Auto Collimator.

For more data circle 129 on Reader Service Card

Now Available in . . . **"SPRAY ON" CANS**  
and in **"BULK"**

## CROWN design layout ink

Order it the way you use it — in handy 12-oz. Aerosol spray cans, or by the pint, quart, gallon or barrel in bulk! Crown ink dries to an excellent scribing texture in a minute! Ideal for pattern, "OK" or "reject" marking.

Contact your distributor,  
or write:

**CROWN INDUSTRIAL PRODUCTS CO.**

809 Amsterdam St., Woodstock, Ill.

For more data circle 458 on Reader Service Card

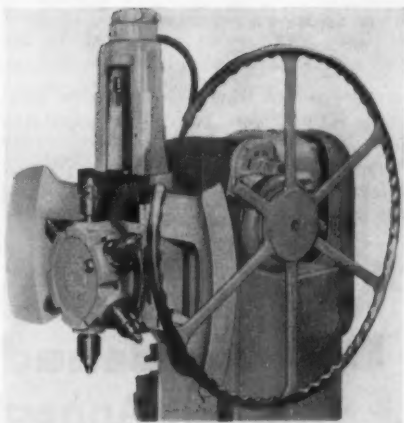


Just Press the  
Trigger on the Can

## NEW VARIABLE POWER FEED

The infinitely variable Burgmaster power feed, with a range of  $\frac{1}{2}$  to 6 inches per minute, has been designed by the Burg Tool Mfg. Co., Inc., 15001 S. Figueroa St., Gardena, Calif. The machine improves quality of work and permits large hole drilling with ease on hand operated Burgmaster Turret Drill Models 2A, 2B and 2BR (radial).

The tool is brought to the work with feed wheel and the starter button is then pressed to engage feed. Engagement is effected through an electric clutch which disengages automatically when the depth stop screw for a particular spindle contacts the depth stop bar. Feed is varied, either before engagement of the clutch or while the cutting tool is in the work, by turning a knob which varies the rate of feed according to a graduated scale. The unit can drive a  $\frac{3}{4}$  inch drill in mild steel at good production rates.



*Burgmaster Infinitely Variable Power Feed*

The infinitely variable feature makes it possible to do single point boring on short runs where sizing tools are not available. It is also said to as-

## *Commander* **TAPPER**

- Wider Range . . . 1 Tapper Handles No. 0 to  $\frac{3}{4}$ " Taps
- Automatic Tap Protection
- Furnished to fit any Drill Press

Commander — "The Tapper That Thinks For Its Operator," has the adjustable full range torque control that instantly stops any tap when it becomes dull, loaded, strikes a hard spot or bottoms in blind hole tapping. Assures maximum tap protection, higher production, even with inexperienced operators.

Your nearby Commander Distributor can give you a demonstration in your own plant. Write for his name and a copy of the NEW Commander Full Line Catalog.

### **COMMANDER MFG. CO.**

4224 W. Kinzie St.

Chicago 24, Ill.



Any operator  
does precision  
tapping with  
a *Commander*  
**TAPPER**

Product of *Commander* . . . Builder of the *Multi-Drill*

For more data circle 459 on Reader Service Card

## new shop equipment . . .

sure excellent finishes due to the constant rate of feed, as well as maintaining tolerances.

Operator fatigue is decreased since the effort of pulling large tools through the work is taken up by the power feed.

Compact, this unit consists of a con-

trol panel, feed engagement switch, depth stop bar and the power feed handle assembly. Table switch is standard. A foot switch is optional.

For more data circle 130 on Reader Service Card

★ ★ ★

## NEW AUTOMATIC CHUCK WORK-HEAD

Modern Devices, Box 429-MM, Libertyville, Ill., has invented and is now

producing the new Dead Eye Center-all chuck work head. This chucking unit can be operated either hydraulically or pneumatically.

The Dead Eye Center-all is self-compensating with each jaw operating independently of the other. It automatically centers and compensates for rough work that has the centers off the center line  $\frac{3}{8}$  inch or that is eccentric by as much as  $\frac{3}{4}$  inch. It grips the workpiece and drives it between two dead centers for 100 per cent concentricity. It revolves around a dead center, cone cup, or any other kind of locating nest. It revolves on roller bearings having long, trouble-free operation. The dead center is easily removed

## Drill Hardened Steels without Annealing -



With the new, improved "HARDSTEEL" Drill, you can do accurate, smooth drilling, countersinking, counterboring and reaming in steels hardened by any process without first annealing the work. And they work with equal ease on work-hardening steels and high carbon-high chrome steels of any degree of hardness.

"HARDSTEEL" Drills fit standard drill presses. They save time and reduce rejects. They permit engineering changes requiring additional drilling after hardening. And parts drilled after hardening always match at assembly.

Write for a copy of the "HARDSTEEL" Operators Manual showing how "HARDSTEEL" drills are cutting costs in thousands of plants.

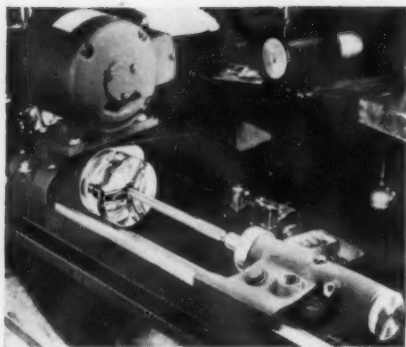
**You Harden It—We'll Drill It—  
With "HARDSTEEL"**

**BLACK DRILL COMPANY, INC.**  
1372 East 222nd St. • Cleveland 17, Ohio

Also makers of—  
**BLACK DRILLING  
UNITS—AUTOMATIC,  
SELF-CONTAINED—  
FOR COST-CUTTING  
PRODUCTION ON  
ALL MATERIALS**

Write for information

For more data circle 460 on Reader Service Card



View of Dead Eye Cen-ter-all Automatic Chuck

for regrounding, and the jaws never have to be adjusted or reground for run out.

Dead Eye Cen-ter-all is claimed to provide good work, fast production, and to eliminate scrap damaged by dog set screws and reduce down time to an absolute minimum. It has a range

from 3/32 to 27/32 inch, with only one set of interchangeable jaws, and is said to permit the operator to run two machines at the same time.

Dead Eye Cen-ter-all is suited for all cylindrical grinding, lathes, milling machines and so on. According to the manufacturer, this head drives anything that can be measured between centers. Its jaws are held in position by only one screw for a fast change-over. It is said to make automatic grinding possible with automatic loading devices.

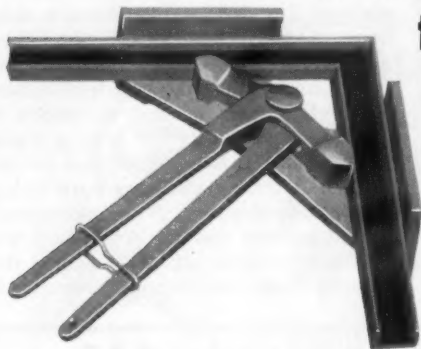
For more data circle 131 on Reader Service Card

★ ★ ★

### **AUTOMATED 8-STATION DRUM TYPE MACHINE**

The accompanying illustration shows one of four Barnesdril Special 8-Station Drum Type Machines, recently completed by Barnes Drill Co., 860

★ ★ ★ ★ ★



## **the POLYP SQUARE SPANNER ----- WELDING FIXTURE**

- Positive grip eliminates "creep" usually associated with welding.
- Assures infinitely greater precision.
- Permits "assembly line" methods for job lots of similar or varied work.

A device to aid in holding stock in position for welding right angles or butts of similar or varied shapes. Clamps rounds, squares, angles, "T" or "H" shapes up to 2 1/4".

Use one for simple welding jobs or use several pre-welding set-ups of more complicated jobs.

Ask your welding supply dealer or write Dept. M-8

**FIREARMS INTERNATIONAL CORPORATION**

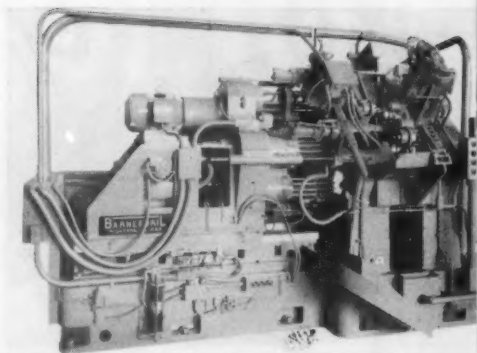
4837 Kerby Hill Road, Washington 22, D. C.

For more data, circle 461 on Reader Service Card

## new shop equipment . . .

Chestnut St., Rockford, Ill., for a mid-western plant of a large automotive manufacturer for completely automated drilling, chamfering, reaming and tapping operations on a rear axle drive gear.

The gears are delivered to the machines by conveyor to loading pocket



Barnesdril 8-Station Drum Type Machine

## ENCO TURRETS Cut Lathe Costs!

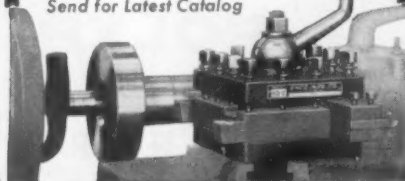
✓ Accurate within .0005.

✓ 12-position indexing.

✓ Indexing is self-contained — eliminates all chip-interference.

✓ Hardened steel construction.

Send for Latest Catalog



**ENCO** Manufacturing Co., Dept. 186  
4524 W. Fullerton Ave., Chicago 39, Ill.

For more data circle 462 on Reader Service Card

on machine. With a completely interlocked cycle, the machine automatically picks up the gears by loading arm which moves them to the loading position. Here they are clamped in the holding fixture. In order to minimize the cycle time for the operation, the drilling is divided and performed at stations 2 and 3. At station 4 a chip blowout unit cleans the holes and they are gauged by an automatic probing unit. Chamfering takes place at station 5. All holes are reamed at station 6. Five holes are tapped at station 7 and the remaining five are tapped at station 8. After the part has been indexed back to station 1, it is automatically unclamped and the unloading arm picks it up and moves it to the discharge chute for conveyor removal. At



## SPEEDY and SAFE CASE HARDENING NON-POISONOUS • NO SPECIAL EQUIPMENT

Indispensable for Machine Shops, Schools, Tool Rooms, Etc.  
1 lb., 5 lb., 10 lb., 25 lb., 50 lb., 100 lb. containers.

**KASENIT COMPANY**  
KING STREET MAHWAH, NEW JERSEY

For more data circle 463 on Reader Service Card



the same time the loading arm picks up a new gear and moves it to the loading station.

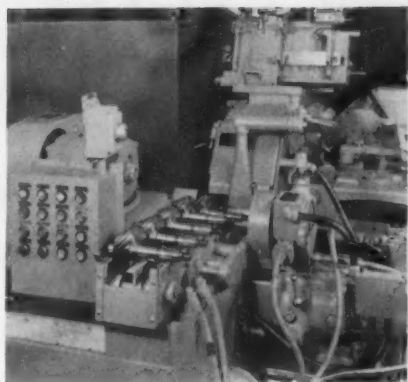
If inadequate depth of the holes or broken tools are found by the probing unit at station 4 the machine is automatically stopped and a warning signal is actuated. The machining cycle is resumed after the part has been removed through the reject chute, and proper tool corrections are made. Production is said to exceed 200 per hour at 80 per cent efficiency.

For more data circle 132 on Reader Service Card



### STEM PINION GRINDER FEATURES AUTOMATIC LOADING AND UNLOADING

An automatic machine for grinding stem pinions has been developed by the Norton Co., Worcester 6, Mass. Important features of the stem pinion

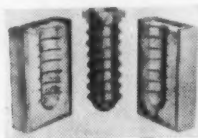


Close-up view of Norton Stem Pinion Grinder

grinder include special workholding and driving equipment with automatic loading and unloading devices. Automatic controls are incorporated into this machine to permit one operator to supervise the production of more than

## With CERRO ALLOYS you can reduce costs of:

Chuckling Irregular  
Work Pieces



Duplicating  
Master Patterns



Bending Thin-  
Walled Tubing



—and many other operations such as making dies, anchoring bushings, securing magnets in fixtures, anchoring shafts in Alnico rotors, aligning and securing shaft bearings, etc., etc. • CERRO ALLOYS melt at low temperatures and are non-shrinking (even expand slightly) in hardening. Send for literature, mentioning operation in which interested.

### CERRO DE PASCO CORPORATION



304 Park Avenue,

New York 22, N. Y.

For more data circle 464 on Reader Service Card

## new shop equipment . . .

one machine. Many of the time-proved features of Norton's CTU cylindrical grinders are included in this special purpose grinder.

Because of the awkward, top heavy characteristics of automotive type pinions, there has always been a high fati-

gue factor in manual loading operations. In this new grinder, the pinions are placed in a loading chute, which automatically moves the pinion down inclined ways toward a revolving turret which then places it in position for the footstock center to engage the center hole and push it forward into the floating type collet on the headstock. The grinding cycle time is preselected on the basis of stock removal and finish requirement.

Upon completion of the grind, the revolving turret takes the pinion from the centers and discharges it into an unloading chute, from which it rolls onto the conveyor located on the front of the machine.

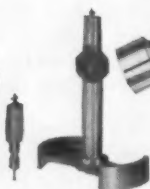
Grinding wheel truing is automatic at predetermined intervals by a wheel head mounted device that contributes important time savings — especially so if wheel forming is required. In addition, this device is said to give close control of the amount of abrasive removed from the wheel face. The wheel head is automatically reset to compensate for the reduced wheel diameter after truing.

For more data circle 133 on Reader Service Card

## If you have a problem of PRECISION INTERNAL GAGING

your answer may be SELF-CONTAINED

## COMTORPLUG



Positive accuracy to  
fractions of .0001"

For holes  $\frac{1}{8}$ " to 10" dia.

### USERS INCLUDE:

Airesearch Mfg. Co.	Hamilton Standard Division
Allison Div.	Harris Seybold Co.
Apex Electrical Mfg.	Homelite Corp.
Buick Motor Div.	Int. Harvester Co.
Century Electric Co.	Jacobs Mfg. Co.
Chicago Pneu. Tool	Lycorning-Spencer Div.
Chrysler Corp.	McDonnell Aircraft
Continental Motors	Northrop Aircraft
Curtiss-Wright	Otis Elevator
Detroit Transmission	Pontiac Motor Div.
Douglas Aircraft	Scintilla Magneto
Fairchild Engine & Airplane Co.	Steel Products Eng.
Falk Corp.	Studebaker-Packard
Ford Motor Co.	United Airlines
General Electric Co.	Warner Gear Div.

### FEATURES INCLUDE:

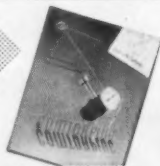
- Positive gaging accuracy to fraction of .0001" regardless of who operates it.
- Portable, self-contained — no wires, hoses, or electronic gear.
- Indicates actual size, a fixed — not passing — reading.
- Positive 2-point gaging — automatic centering.
- Shallow holes, deep holes, inside splines, open-end holes gaged easily.
- Detects ovality, back or front taper, bell mouth, barrel shape.
- Reaches to bottom of blind holes.
- Gages work while still held in chuck.
- A shop tool for all-day every day use.

**SEND FOR BULLETIN 49**  
**It may hold your answer**

**COMTOR COMPANY**

64 FARWELL ST., WALTHAM 54, MASS.

For more data circle 465 on Reader Service Card

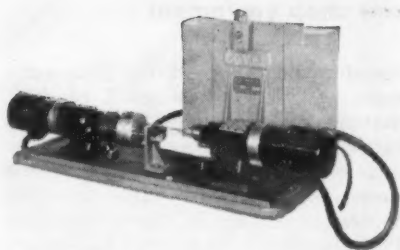


## MACHINE PERFORMS THREE OPERATIONS AUTOMATICALLY

A bench-type drilling machine which, by means of two Govro-Nelson automatic drilling units, one with a 2-spindle head, performs two drilling and one counterboring operation automatically with one loading has recently been announced by the Govro-Nelson Co., 1933 Antoinette St., Detroit 8, Michigan.

The operator loads and clamps the part in a simple fixture, next depresses the start-cycle switch, then the left-hand drilling unit automatically feeds forward and drills two holes. The withdrawal of the spindles causes the right-hand unit to feed in automatically to counterbore one of the two holes previously drilled. With this simple set-up, the three operations are performed automatically at an output rate in excess of 300 pieces per hour.

By making slight changes in mount-



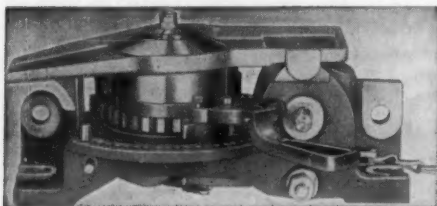
Govro-Nelson Automatic Drilling Machine

ing and fixtures, the machine is readily adaptable to drilling a variety of parts. For more data circle 134 on Reader Service Card

★ ★ ★

## AUTOMATIC DRILL, CHAMFER AND TAP MACHINE

The Michigan Drill Head Co., Detroit 34, Mich., has announced a new contribution to the ever growing field of automation — a combination drill,



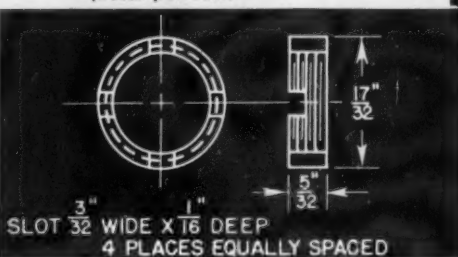
## DEARBORN Automatic Chucking and Indexing Fixture

### FEATURES:

1. Work held by collets
2. Automatic opening and closing
3. Work automatically ejected
4. Automatic indexing if required
5. Three models with capacities from 1/32" to 2".

**J. W. DEARBORN**  
ANSONIA • CONN.

Write for illustrated data. Send blue-prints or specifications of work.



For more data circle 466 on Reader Service Card

## new shop equipment . . .

chamfer and tap machine. This automatic machine is designed to drill, chamfer and tap a  $\frac{5}{8}$ -18 hole in a flange nut. It performs all these operations on 750 flange nuts per hour and ejects the complete parts into the chutes, as shown in the illustration. The machine is built to J.I.C. stand-



**NEW NESTING TYPE  
TOTE PANS**

Sturdy 16 ga. metal.  
20" long x 12" wide  
x 6 $\frac{1}{4}$ " deep. Drag  
holes and handles at  
both ends.

**J. L. LUCAS & SON, INC.**  
Bridgeport 5, Conn.

For more data circle 467 on Reader Service Card

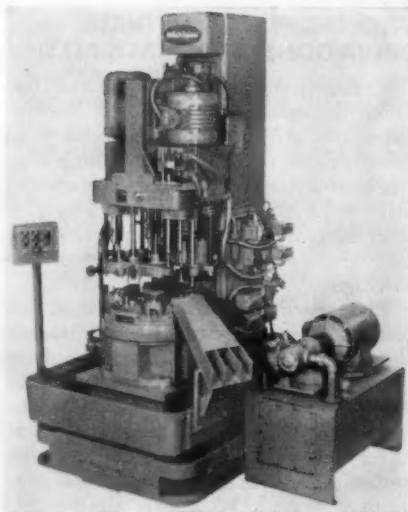
## C A M S

Fully equipped modern machine shop with  
extensive Jig Boring, Surface Grinding,  
Horizontal Boring and Thread Grinding  
facilities as well as modern Cam Milling  
and Cam Grinding equipment.

**Your Inquiries Answered Promptly**

**HIMOFF MACHINE CO., INC.**  
23-16 44th Road Long Island City 1, N. Y.

For more data circle 468 on Reader Service Card



Michigan Drill, Chamfer and Tap Machine

ards and is equipped with automatic lubrication throughout. A self-contained coolant tank is built into the base of the machine. The tank features easy accessibility and outside clean-out.

This machine has been engineered and built using standard components, including a standard hydro 3 vertical unit with a six spindle combination drill and individual lead screw tapping head, also a 20 inch, 5 station, 2 place fixture with power clamping and an automatic ejection feature.

For more data circle 135 on Reader Service Card



## SPELLMACO "SPOTTERS"

**A matched set of transfer punches  
for toolmakers, machinists & tool cribs**

Used for transferring location of threaded, drilled  
and reamed holes, slugs, blanks, etc.

Precision made of finest tool steel—Carefully heat treated and tempered for long life—.0025 undersize to facilitate use—Black oxide finish.

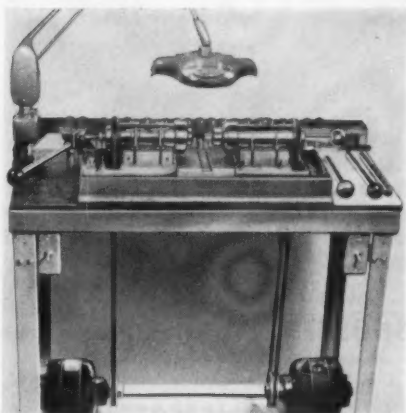
SET #3-17; 28 punches with indexed stand—sizes  $\frac{3}{32}$ " to  $\frac{1}{2}$ "  
by  $\frac{1}{64}$ "—plus handy  $\frac{17}{64}$ " size. Length  $\frac{4}{8}$ ". ONLY \$16.80.  
Single sizes available

**R. L. SPELLMAN CO. • URBANA, OHIO**

For more data circle 469 on Reader Service Card

## DRILLING MACHINE FOR CONSECUTIVE HOLE FINISHING OPERATIONS

The Micro Drill Guide Division, JEDCO, Inc., 3980 Superior Ave., Cincinnati 36, Ohio, has announced a new horizontal type drilling machine that makes possible consecutive hole finishing operations with multiple tooling, without removing the workpiece from the machine. One model of the Jedco Micro-Drilling Machine drills holes axially through a cylindrical part. With suitable attachments and modifications, another model can be used to finish holes on rectangular coordinates to an accuracy of plus or minus 0.0005 inch. Each machine has multiple tool quills that allow a series of operations; including drilling, chamfering, reaming and so on; to be done consecutively without the necessity of removing the workpiece from the machine or the individual tools from the



View showing Jedco Micro-Drilling Machine

tool quills. These machines also feature collets, chucks or special work-holding fixtures on the headstock. The spindles are supported on preloaded precision ball bearings.

For more data circle 136 on Reader Service Card

# UNIVERSAL PARKSON GEAR TESTER

## FOR SPUR - WORM AND HELICAL & BEVEL GEARS



**CYLINDRICAL  
BUSHING**



ABOVE PHOTO SHOWS  
SET-UP FOR WORM GEARS  
TO CHECK CENTER  
DISTANCE, CONTACT  
OF TEETH, RUNOUT, ETC.



**ADJUSTABLE  
V-BLOCK**

Scale and Vernier, Ease of adjustment,  
Convenient Features to hold Worm and Shaft on V-Blocks or Bushing.

**PARKSONS ARE MADE IN SIZES**  
**9" - 15" - 24/30" — PLAIN AND UNIVERSAL**

**ASK FOR DESCRIPTIVE ILLUSTRATED BULLETIN**

**GEORGE SCHERR CO., Inc.**

**200-MM LAFAYETTE ST. • NEW YORK 12, N. Y.**

For more data circle 470 on Reader Service Card



**new shop equipment . . .**

### **TOOL CONTROL SYSTEM**

Seibert and Sons, Inc., Chenoa, Ill., has announced that it is now manufacturing, under a patent licensing agreement, a new tool control system commonly known by machine tool builders and users as tool boards. The

new Seibert unit includes tool holding board, bench, cyclometers, adjustable adapters, gages and fixtures tailored to suit each machine application.

The inherent advantage of this type of tool control system lies in the convenient facilities for storing and pre-setting duplicate tools at the machine and the automatic cyclometer control of machine operations, predetermined for each set of tools used. In effect, it

provides a system of scheduling or programming tool changes to achieve higher operating efficiency. At the same time, the cyclometer panels provide a visual record for the used and unused life of each tool operating in the machine. Standards of performance for all tools are established, which serve to reduce tool breakage, grinding costs, scrap losses and down-time. Standards are worked out to serve each specific production requirement and machine requirement.

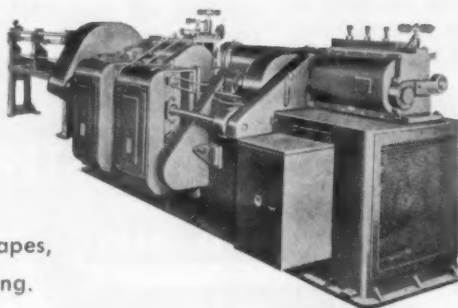
Seibert and Sons will also provide, as an important part of the new tool control system, presetting gages as required for each specific job requirement. Also, bench drawers, shelves and

**SHUSTER wire straightening and cutoff NEWS!**

## **NOW! ELECTRICALLY CONTROLLED CLUTCH AND TARGET ON INFINITE SPEED**

**SHUSTER**

**3 AV**



**SHUSTERS**

are available  
for .025" to  
1 1/16" wire; shapes,  
flat stock, tubing.

Variable speed of feed and cutoff is individually controlled. And now, with electrical control of clutch and target, the 3AV straightens and cuts wire (1/4" to 1/2") with great accuracy and efficiency.

**METTLER**  
**MACHINE TOOL, INC.**

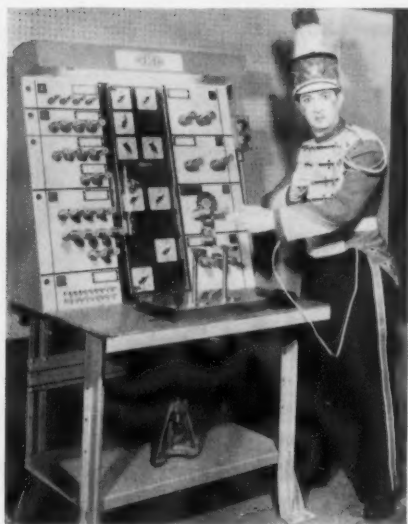
**157 Adeline Street**

**New Haven, Connecticut**

For more data circle 471 on Reader Service Card

286 modern machine shop

August, 1956



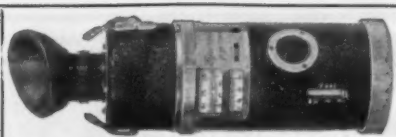
View of new Seibert Tool Control System

bench tops will be individually built and arranged to suit the user's needs. For more data circle 137 on Reader Service Card

★ ★ ★

## DUAL PURPOSE LIVE CENTER

Motor Tool Manufacturing Co., P. O. Box 3805, Detroit 5, Mich., has introduced a center that has a removable pipe head, which can be detached with a light tap to make a regular type center of the tool. The pipe head is deeply countersunk for low overhang. Except for a longer spindle projection, this is the same heavy-duty construction as the regular Motor Tool live center line, with heavy-duty radial roller bearing (28 inches of line bearing contact in the No. 4 Morse taper size), heavy-duty ball thrust bearing, long wearing needle bearings to steady the spindle, alloy steel housing, case hardened on outside only for long wear and toughness, tough high carbon, high chrome spindle, tempered steel springs to com-



The simplified PYRO Optical is the Ideal Instrument for direct temperature readings of ANY heated object in your plant. Completely SELF-CONTAINED, PORTABLE, RUGGED, LIGHT WEIGHT (3½ lbs.) and FOOL-PROOF. No correction charts, no accessories and no maintenance expenses. Unique design permits temperature determination even on MINUTE SPOTS, Fast MOVING OBJECTS and of the SMALLEST STREAMS.

Write for Catalog No. 85

THE PYROMETER INSTRUMENT CO.

New Plant and Laboratory, Bergenfield 42, N. J.

For more data circle 472 on Reader Service Card

**WARNER** CLUTCHES  
BRAKES  
& PARTS

SHIPPED FROM STOCK

**WOOD-COMPTON CO.**

25010 LAKELAND BLVD., CLEVELAND 32, O.

For more data circle 473 on Reader Service Card

**NUMBERALL**

CUTS THE COST OF STAMPING NUMBERS

### Improved TYPE HOLDERS

Hand or Press style. Type can be easily, quickly loaded and unloaded. Simplest construction . . . Just a sturdy pin holds the type securely.

No screws nor springs. Super-quality steel type made in various sizes: 1/32" up to 1/2" figures and letters.




Write for Bulletin MS23H Steel Type

**NUMBERALL STAMP & TOOL CO.**

HUGUENOT PARK, STATEN ISLAND 12, N. Y.

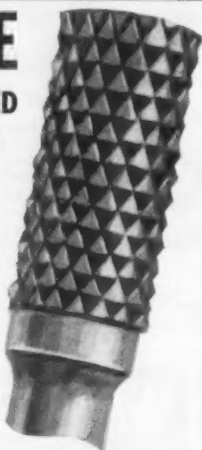
For more data circle 474 on Reader Service Card

# CARBIDE

## SOLID and TIPPED CUTTING TOOLS

### Stock Tools:

Burrs—Carbide  
Drills—Solid Carbide  
and Tipped  
Internal Grinding  
Burrs—Solid Carbide  
Reamers and End Mills  
—Solid Carbide  
and Tipped  
Slitting Saws—Solid  
Carbide  
Rotary Files H.S.S. —  
Hand cut and  
ground from the  
Solid

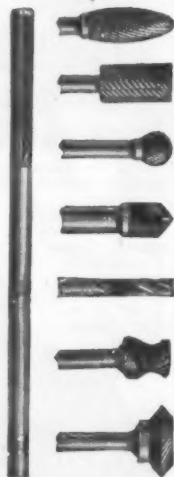


### Specials:

In addition to the foregoing, ESSEX maintains a special tool designing department and can supply the following in Solid Carbide and Carbide-

#### Tipped Tools:

Counterbores  
Step-Drills  
Twist Drills  
Dies  
Grooving and Milling  
Cutters  
Key Cutters  
T-Slot Cutters  
Router Bits  
Profiling Cutters, Etc. to  
sketch or blueprint  
Complete resharpener  
and reconditioning serv-  
ice available.  
Areas available for distributors  
—inquiries invited.



Makers of Fine Tools Since 1868

**ESSEX ROTARY FILE & TOOL  
CORPORATION**

295 MADISON AVE. • NEW YORK 17, N. Y.

For more data circle 475 on Reader Service Card

288 modern machine shop

new shop equipment . . .



View of Motor Tool "Two Timer" Live Center

pensate for elongation of work through heating, grease seal to retain lubrication and keep out dirt and chips.

This center is available for Nos. 3 and 4 Morse tapers, with heads of 3 and 4 inch diameters, respectively.

For more data circle 138 on Reader Service Card

★ ★ ★

## RAM TYPE UNIVERSAL TURRET LATHE OFFERED IN THREE MODELS

New throughout, both in styling and in construction, the Gisholt "Master-line" Ram Type Universal Turret Lathe, now being built by Gisholt Machine Co., Madison 10, Wis., is available in three basic models. The No. 3 lathe has a 1½-inch round bar stock capacity, the No. 4 lathe has a round bar stock capacity of 2 inches, and the No. 5 lathe can be furnished to handle either 2½-inch round bar stock or 4½-inch round bar stock through the spindle. All models can be equipped with the Gisholt JETracer, mounted on the rear of the cross slide or on a single turret face. The machine can also be

August, 1956

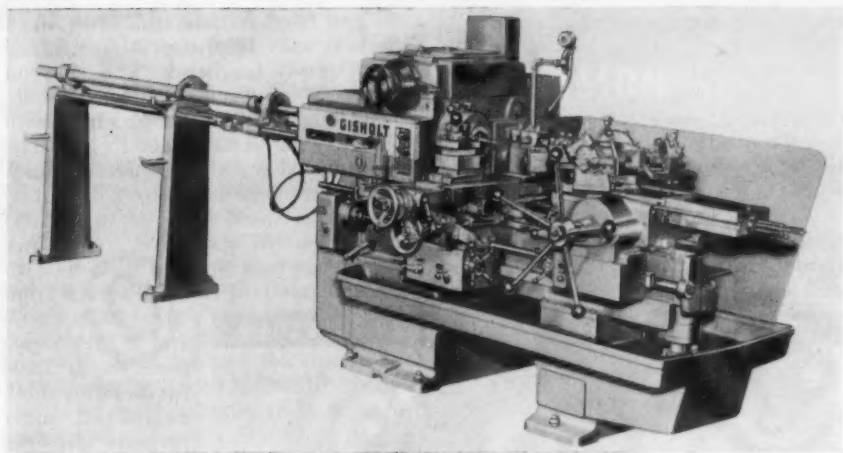
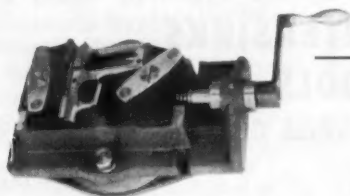


Illustration showing view of Gisholt "Masterline" Ram Type Universal Turret Lathe furnished with a Lynn Hydraulic Drive unit as a part of the original equipment in order to provide for completely automatic operation.

A new, scientific bed design, with extra heavy webbing and cross supports, provides maximum rigidity and assures freedom from vibration. The ma-

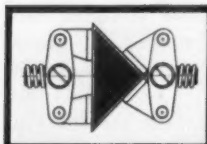
★ ★ ★ ★ ★  
**ENGINEERED FOR ALL YOUR TOUGH JOBS**



**the POLYP**

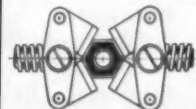
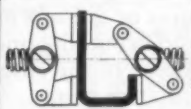
**CLAMP and  
CLAMPMASTER**

**Holds Odd and Irregular  
Shaped Parts**



POLYP Universal Clamp has free swinging jaws. The jaws of the POLYP Clampmaster can be locked in any predetermined position.

Now—a practical holding device of unlimited application in tool rooms, repair shops and factories for use on machine tools, on assembly lines, or on the work bench!



The POLYP Clamp combines precision, ruggedness and versatility. Only POLYP gives you four perfectly balanced pressure points which evenly distributes the holding force, assuring sufficient gripping power, even when clamping delicate parts. Various sizes available.

For more complete details write Dept. M-8.

**FIREARMS INTERNATIONAL CORPORATION**

4837 Kerby Hill Road

Washington 22, D. C.

For more data circle 476 on Reader Service Card

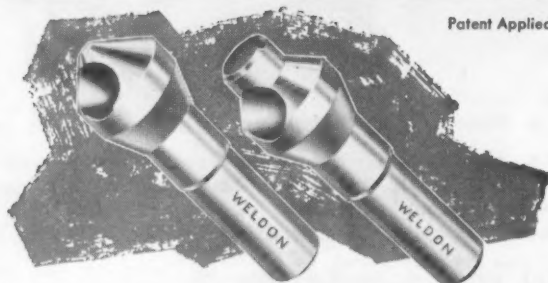
## new shop equipment . . .

chine has a cast iron chip pan which is incorporated with a cabinet leg for the motor and with coolant reservoir leg.

A rugged new headstock permits transmitting up to 30 h.p. through hardened and ground alloy steel gears and shafts mounted in easily-adjust-

ed, anti-friction bearings. The No. 3 machine may be furnished with an 8 or 16 speed headstock. The 8 speed headstock offers a standard spindle speed range of 40 to 1,500 r.p.m. with a high range of 53 to 2,000 r.p.m. The 16 speed No. 3 machine offers a standard speed range of 30 to 1,500 r.p.m. and a high speed range of 40 to 2,000 r.p.m. The No. 4 and No. 5 machines have a standard 16 speed headstock offering a standard range of speeds from

**YESTERDAY'S PIONEER . . . TODAY'S LEADER**



Patent Applied for

## **WELDON COUNTERSINKS** **and DEBURRING TOOLS**

**60° - 82° - 90° - 100° ANGLES • LARGE CENTER  
CHATTERLESS**

Greater ease in cutting and longer life are the outstanding features of these WELDON tools for countersinking and deburring operations. Chatter is eliminated because of the single cutting edge. One trial will convince you.

Write for further details

Weldon distributors throughout U.S.A. and Canada  
carry complete stocks to serve you.

## **THE WELDON TOOL COMPANY**



**3000 WOODHILL ROAD . . . CLEVELAND 4, OHIO**

For more data circle 477 on Reader Service Card

30 to 1,500 r.p.m. and a high range from 40 to 2,000 r.p.m. Filtered oil, delivered under pressure, provides cascade lubrication to the entire lathe headstock assembly.

The Gisholt Hydraulic Speed Selector is standard on all models. Speed shifts are accomplished in three seconds or less by smooth hydraulic power, controlled by movement of the speed selector handwheel, without stopping the spindle or disengaging the clutch.

Swing over the ways for the No. 3 and No. 4 machines is 19½ inches, and the No. 5, 21½ and 4½-inch machine features a swing of 21¾ inches.

For more data circle 139 on Reader Service Card



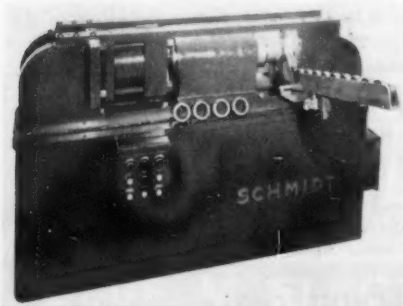
## HYDRAULIC BEARING MARKING MACHINE

Geo. T. Schmidt, Inc., 1806 Belle Plaine Ave., Chicago 13, Ill., has announced the Model 385 hydraulic bearing marking machine. This machine was designed specifically for marking the face of bearing races in production. It is operated by a remote hydraulic unit. Capacity is flexible, being equipped with adjustable feed and discharge chutes and throat adjustment to accommodate bearings from 15/16 to 3 7/8 inches in diameter and thicknesses of 1/2 to 1 3/8 inches. Feed spiders are available to fit each diameter of bearing to be marked.

The remote hydraulic unit consists of a 12 g.p.m. pump, 60 gallon tank and a 10 h.p. motor. It develops 30 tons pressure, which will sink lettering dies engraved 0.025 inch deep to the background of the characters, providing ample depth for grind on face. The cycle is automatic. A variable drive provides marking capacity from 1,250 to 1,680 bearings per hour.

Bearings may be fed directly from turret lathe to marking chute and after marking roll to opposite side of machine into discharge chutes. No operator is required to operate this hydraulic marking machine.

For more data circle 140 on Reader Service Card



Schmidt Hydraulic Bearing Marking Machine

August, 1956

## PRECISION INTERNAL FORMING



## with a MAXWELL RECESS-O-MATIC

Fast set-up . . . repetitive accuracy . . . maximum capacity and throw . . . these features make the RECESS-O-MATIC tool superior for precision internal forming operations. Designed especially for use on multiple-spindle automatics, this tool can be attached quickly without need for special cams.

The RECESS-O-MATIC is available in three sizes having maximum capacities of 2, 3 and 4-inches. Recessing stroke ranges from 1/4 to 1/2-inch.

Write for catalog.

(Type DB)

BBC-MC



## THE MAXWELL COMPANY

MACEDONIA, OHIO

For more data circle 478 on Reader Service Card

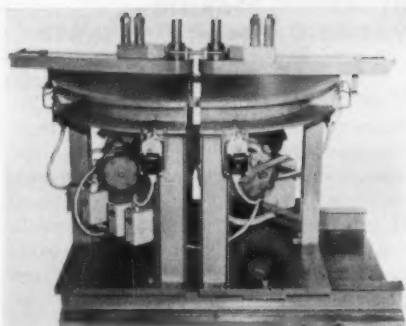
modern machine shop 291

**new shop equipment . . .**

### **AUTOMATIC BENDING MACHINE**

The Pedrick Tool and Machine Co., 3640 N. Lawrence St., Philadelphia, Pa., has developed a new bending machine which bends both ends of a pipe, tube strip or shape, automatically.

It comprises two machines, each with a motor and relay control, mount-



*View showing Pedrick Bending Machine*

Precision • Convenience • Economy

### **HINGED SINE PLATES**

**5" and**

**10" ... AT LOW COST**

Bald Eagle Sine Plates are *Guaranteed Accurate* within .0002" in center distance and parallelism for length of tool. Double normalized for maximum stability. Adapted for permanent magnetic chuck. No. 1810 has .1000" recess and heavy duty side rail.

**Positive Locking  
Device**

**Precision Ground**

**Hardened Rolls**

**Immediate Shipment**

No.	Center Dist.	Top Width	Price
1805	5"	3"	\$109.50
1810	10"	5"	265.00

Bodies Hardened at Extra Cost. FOB St. Paul

*Write for literature on complete line.*

*Order from your dealer or direct.*



**Bald Eagle Tool Co.**

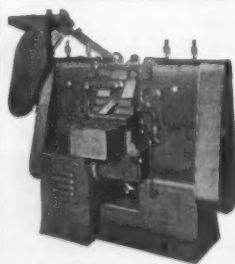
357 Minnesota St. • St. Paul 1, Minn.

For more data circle 479 on Reader Service Card

ed on a base which is adjustable as to centers and is controlled from a single starting button. One unit bends clockwise or counterclockwise, but both units may be made to bend clockwise or counterclockwise if it is desired to bend offsets. One unit may be made to bend 90 degrees, the other 45 degrees or any curvature up to 180 degrees. Centers are adjustable either manually or by means of a lead-screw driven by a motor. The machine may or may not be provided with an ejector.

When fully equipped, the Pedrick can be made completely automatic, taking stock from a hopper and delivering it to a conveyor in finished condition without an operator. Its primary use is in bending two right angles in the same plane simultaneously.

For more data circle 141 on Reader Service Card



### **for speedy drilling OF COTTER PIN HOLES IN SCREWS, BOLTS, ETC. The KENT Duplex DRILLER**

Two drills move toward the center. One drill then withdraws and the other completes the hole. Parts can be drilled and countersunk at the same operation. Semi-automatic or full automatic feed. Write for illustrated descriptive literature.

**The KENT MACHINE CO. • Cuyahoga Falls, O.**

*Drillers • Threaders • Slotters • Countersinkers • Bar Pointers*

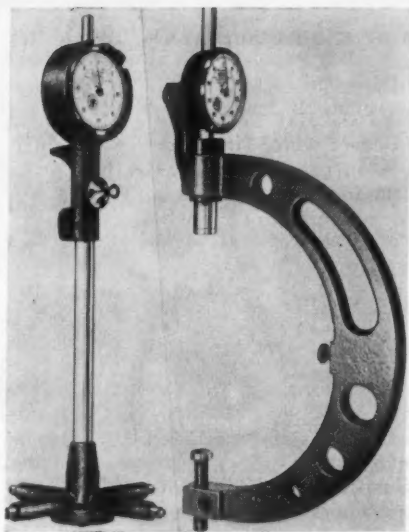
For more data circle 480 on Reader Service Card

## SPECIAL DIAL INDICATOR GAGE FOR WHEELS AND AXLES

In order to achieve the greatest degree of accuracy in checking turned-down railroad wheel seat diameters, a new series of special gages has been developed. These devices have been designed by the Federal Products Corp., 6146 Eddy St., Providence 1, R. I.

One series is the 264 P-400 dial snap gages. These gages measure the wheel seat diameter of the axles and adjust to measure two sizes of axles. There are five sizes of snap gages, which cover axle sizes from  $5\frac{1}{8}$  to  $8\frac{3}{4}$  inches. The gage capacities are from  $4\frac{3}{4}$  to  $8\frac{7}{8}$  inches.

Two vertical type hole gages, Models B4F P-3 and B4F P-4, have been designed to check the inside diameter of wheel bores that fit on the axles. Each of these gages has four contact points—two gaging and two centralizing.



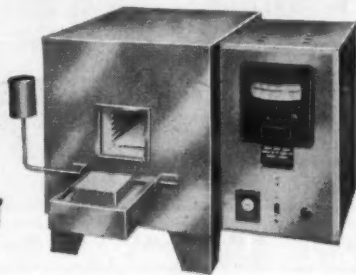
Federal Gages for railroad wheelbores, axles

## Stabil-Glow BENCH MODEL muffle furnaces

STABIL-GLOW R-A-D-I-A-T-I-O-N  
NO HOT SPOTS

High Quality — Low Cost  
Automatic — Dependable — Accurate  
Blue M's NEW Modella Elements — 2000° F.

Efficient processing of parts is easy with Stabil-Glow. New element design and Electronic Controller gives automatic precision results. Modern design — for heavy industrial or laboratory usage. Ready to operate.



MODEL	MUFFLE SIZE	K.W.	VOLTAGE	PRICE
2010	5" W x 5" H x 12" D	2.4	115V.	\$395.00
2030	6" W x 5" H x 13" D	3.0	230V/1 ph.	445.00
2050	9" W x 6" H x 13" D	6.0	230V/1 ph.	575.00

Larger capacity models with higher range and for 440 volts available.

Manufacturer of ovens, furnaces and related temperature controlled equipment.



# BLUE M ELECTRIC COMPANY

138th AND CHATHAM STREET

BLUE ISLAND, ILLINOIS

For more data circle 481 on Reader Service Card

## new shop equipment . . .

Model B4F has four sets of contacts to cover wheel sizes from 5 1/8 through 6 5/8 inches. The B4F P-4 has seven sets to cover sizes ranging from 6 1/2 inches through 8 3/4 inches.

For more data circle 142 on Reader Service Card

★ ★ ★

## SEPARATION MAGNET

Stearns Magnetic, Inc., 664 S. 28th St., Milwaukee 46, Wis., has announced a new line of suspended separation magnets for use with conveyor systems. Suspended over the head pulley or anywhere along the belt, the magnet's pulling force digs out imbedded tramp iron in the flow of material and prevents "sneak throughs" that could con-



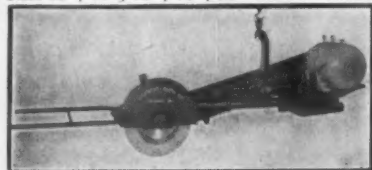
Stearns Suspended Separation Magnet

taminate the product or ruin expensive processing machinery.

For more data circle 143 on Reader Service Card

## MUMMERT-DIXON SWING FRAME GRINDERS

Sizes 12", 14", 16", 18", 20" and 24" wheels.



Ask for Descriptive Circular

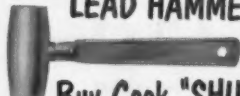
**MUMMERT-DIXON CO.**

120 Philadelphia St.

Hanover, Pa.

For more data circle 482 on Reader Service Card

## LEAD HAMMERS—



Buy Cook "SHUR-GRIP"

They're a MUST in every shop where many blows have to be struck without marring surfaces. Available with "SHUR-GRIP" drop forged handles.

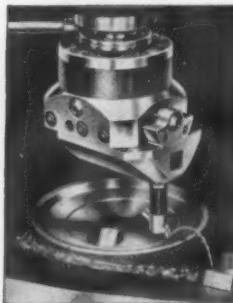


Write for circular and prices

**LAWRENCE H. COOK, INC.**

67 MASSASOIT AVENUE, EAST PROVIDENCE 14, R. I.

For more data circle 483 on Reader Service Card



## REASONS WHY MODERN ENGINEERS SELECT The Wohlhaupter MASTERHEAD

For Precision Work & Most Economical & Automatic Operation

- The MASTERHEAD does Boring, Facing, Recessing, Undercutting, Outside Turning, etc.
- It does this in One Operation and on One Machine.
- Automatic Feeds. • Automatic End Release.
- Increases the capacity of your present equipment.
- Increases Production, makes Better Finished Work.
- Nine Models available for work up to 36 1/4" diameter.

Also taper cutting heads.  
Send for illustrated literature

Sole Agent

**KARL A. NEISE, 404 Fourth Ave., Dept. MMS,  
New York 16, N. Y.**

**NEISE  
MODERNTOLS**

For more data circle 484 on Reader Service Card

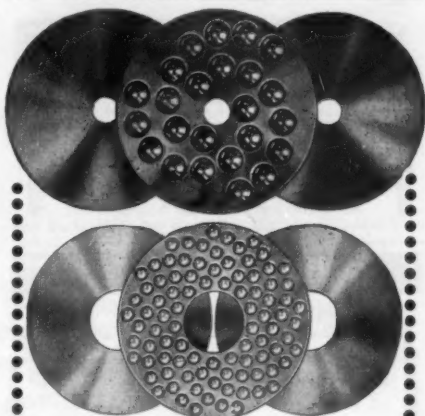
## IMPROVED SURFACE GRINDER INCREASES ACCURACY AND PRODUCTION

Mattison Machine Works, Rockford, Ill., has redesigned its Models 24 and 36 Vertical Rotary Surface Grinders to increase stock removal rates and accommodate new types of work requiring closer tolerances. Automatic cycling is available on these high-powered surface grinders through the use of one of two automatic systems that may be installed at extra cost. Either system will provide push-button actuated automatic cycling which includes switching on the coolant pump; moving the table into grinding position; magnetizing the table and starting it rotating; feeding to size, according to gaging system; sparking out; and returning all elements of the machine to loading position.

The air-gaging system measures the work continuously and gives the operator visual indication that parts are approaching size. The micro-switch automatic sizing system is an electro-mechanical measuring device which measures the work continuously and actuates the automatic cycle at the completion of the grind. The machine is then ready for the next load.

A new continuous down feed system increases the range of feeds. Another important new feature is the redesigned base which is stronger and more

rigid, with added cross-girths. The coolant tank is now separate from the machine so that changes in coolant temperature cannot affect its accuracy. The new base casting is Meehanite, stress relieved by heat treating. Two flushing nozzles have been installed in the base to wash sludge into the coolant tank. All ways of the column and



### BALL THRUST BEARINGS

STANDARD SIZES ARE SHOWN IN OUR  
GENERAL CATALOG, SENT UPON REQUEST.

*Serving Industry for Over 43 Years.*

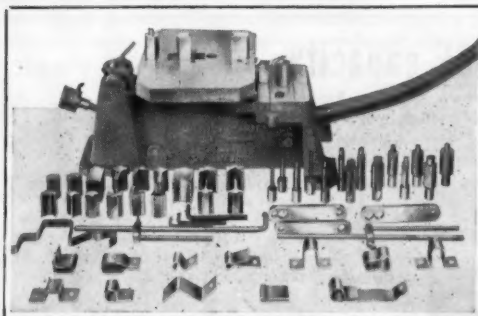
### THE WILLIAM COMPANY

INCORPORATED 1912

358 FURMAN ST.

BROOKLYN 1, N. Y.

For more data circle 485 on Reader Service Card



## Multiform

### BENDER CUTTER

Users report the Multiform Bender one of the handiest tools in the shop. No special tooling . . . Bends, Cuts, Punches, Flats, Rounds into Any Shape, Clamps, Brackets, Springs, Busbars, Wire Forms, Aircraft Work, Steel Rule Dies, Etc.

**AIR OR HAND MODELS FOR UP TO  
1/4" to 4" MATERIAL**

Write for brochure which illustrates  
and describes the four bender models.

**J. A. RICHARDS CO.**

Dept. 6-M

Kalamazoo, Mich.

For more data circle 486 on Reader Service Card



## new shop equipment . . .

base are fully protected at all times, regardless of the position of the carriage or grinding head.

Two spindle drive systems are offered. One is the standard built-in-drive with semi-enclosed motor. The other system is a coupling-type drive with

**CUT TOOL COSTS**

broken tools  
made like new again  
with **NU-TANGS**

Twisted or broken tongs replaced at low costs on any tool with a Morse Taper (sizes 1 to 6). Hundreds of leading industries save money on drills, reamers, countersinks, cutters, drivers, the NU-TANG way. Prompt delivery. Send for prices—or send tools for repair. All work guaranteed.

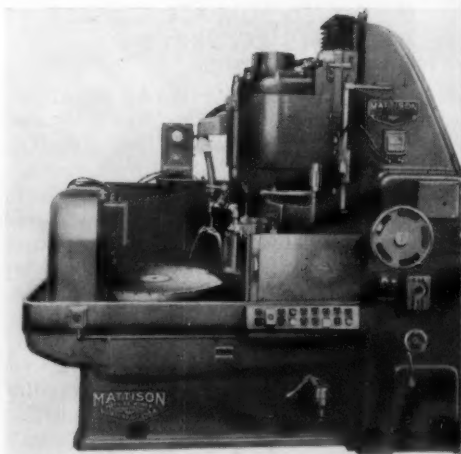
**NO WELDING!**  
**NO SHORTENING!**  
**NO SLEEVES!**  
**NO DISTORTION!**

**GUARANTEED**  
**STRONG AS NEW!**

Send them to us like this! We return them like this!

**NU-TANGS INC.** 1339 Bates Avenue  
Cincinnati 25, Ohio

For more data circle 487 on Reader Service Card



**Mattison Redesigned Rotary Surface Grinder**

standard T.E.F.C. motor which meets J.I.C. standards. A new venting method has been applied to the motor to prevent coolant mist from being drawn into it and causing damage.

Standard equipment on the Model 24 is a 30-inch magnetic chuck and 18-inch segmented wheel. (Available options include a 36-inch chuck and 20-inch wheel.) On the Model 36, a 36-inch magnetic chuck is used with an 18-inch wheel. (Available options include a 40-inch magnetic chuck and 20 and 22-inch wheels.) Both machines are designed for heavy stock removal,

## JIG BORING

and  
**Large Precision Machining**

Done to your specifications

**We Have 21 Jig Borers**

**KIDDE PRECISION TOOL CORP.**

18 LOCUST AVENUE, ROSELAND, N. J.

For more data circle 488 on Reader Service Card

## A SMALL saw with LARGE capacity

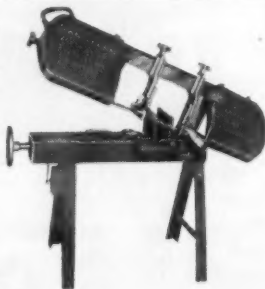
**MODEL A**—Capacity 6" x 11" with BIG machine features. Rugged construction. Precision saw guides. Adjustable cutting pressure and rate of descent. Quick action swivel vise. 1/2" blade. Rotary blade brush. Automatic blade shut-off. 1/2 H.P. motor with overload protection. Table available to use saw vertically for contouring, notching, and slotting!

Send for FREE CATALOG. Dept. M.

**W. F. Wells and Sons**  
Metal Cutting Band Saws

**THREE RIVERS**  
MICHIGAN

**Model A**



For more data circle 489 on Reader Service Card

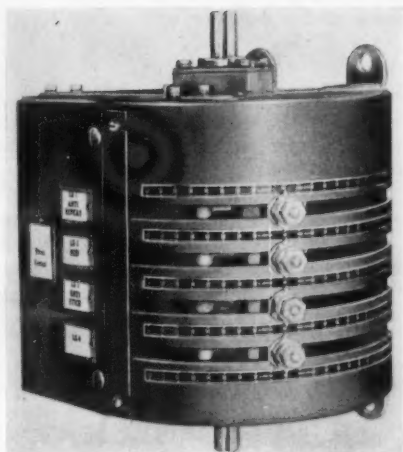
with a 40 h.p. motor standard on the Model 24, (50 h.p. motor available on special order), and a 50 h.p. spindle motor standard on the Model 36.

For more data circle 144 on Reader Service Card

★ ★ ★

## ROTARY CAM LIMIT SWITCH

A rotary cam limit switch for mechanical presses has been announced by Danly Machine Specialties, Inc., 2100 S. Laramie Ave., Chicago 50, Ill. This limit switch features fast external adjustment of the cams while the press is in operation. It is unnecessary to stop the press while adjusting the timing of either the press controls or auxiliary equipment synchronized to the press cycle. This is said to eliminate much of the guesswork in the timing of the switch, since adjustment can easily be made while observing the operation of the equipment. Split-second timing



Danly Rotary Cam Limit Switch for presses

of the control circuits is made through an adjustment of each cam by setting a thumbscrew on the outside of the

## HI-DUTY DRILLS

Since 1903

- FLAT TWISTED
- ROLLED SECTION

HI-DUTY—your assurance of increased production . . . lower drill costs!

**PROMPT DELIVERIES** on special types of High Speed Drills—special diameters and lengths; also step drills. Large variety in stock!

Contact your Industrial Supplier—or write for FREE Catalog and Price List.

**HI-DUTY DRILL WORKS**  
FLEETWOOD, PENNSYLVANIA

For more data circle 490 on Reader Service Card

## Accurate Hole Transfer Made Easy With NIELSEN TRANSFER SCREWS

Simply insert in holes, invert, strike sharply and you have centers and drill circles perfectly located. Reduce time and eliminate spoilage of other methods. 8 sizes, from 3/16" to 3/4" U.S.S. Inexpensive—Last for years.



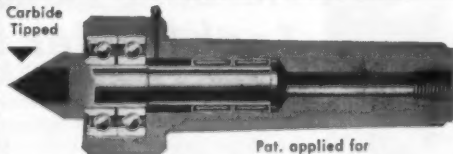
Write for Circular  
**NIELSEN TOOL & DIE COMPANY**  
P. O. Box 1067  
Berkley, Mich.

For more data circle 491 on Reader Service Card

## Don't let HABIT blind you to a better Live Center

Check your present live center's performance against that of a carbide tipped Cross Center—and realize the difference. Two to three times greater load capacity—greater precision. Test one! Available in Nos. 1, 2, 3, 4 and 5 Morse Taper, or straight shanks, other shanks to order. No. 2 M.T. \$39.00. Money back guarantee. Supplied also with tool steel tips. Ask for folder. Write direct, if distributor cannot supply you.

Carbide Tipped



**HERBERT CROSS & SON, Bala-Cynwyd 1, Pa.**  
Est. 1910 \*Makers of famous WEE Live Center.

For more data circle 492 on Reader Service Card

## **new shop equipment . . .**

housing. This adjustment is performed in complete safety without exposing the operator to electrical connections or moving parts.

A drive failure circuit, which will stop operation of the main equipment should mechanical failure of the switch drive occur, is also included. This fea-

ture prevents damage to the press auxiliary equipment synchronized to the switch circuits.

For more data circle 145 on Reader Service Card

★ ★ ★

## **FOUR-HEAD CONVEYOR-TYPE BELT GRINDER PERFORMS FOUR SIMULTANEOUS GRINDING OPERATIONS**

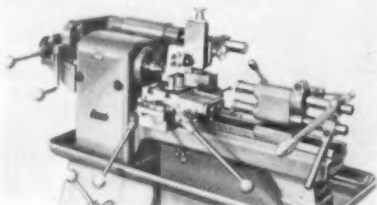
A contact-wheel abrasive belt machine, that permits four simultaneous grinding operations, has been announced by the Engelberg Huller Co., 103 Seneca St., Syracuse, N. Y. Designed for high-volume flat surfacing of ferrous and non-ferrous metals, glass, plastics, ceramics and other materials, the four-head Model 680-4 belt grinder produces extremely fine micro-inch finishes to exacting tolerances, and makes possible a single-cycle operation from rough casting to polished part.

Typical multiple grinding sequence, using a series of progressively finer belts is, rough grind, two semi-finishes and finish grind. One pass under the four heads can remove an approximate maximum of 0.020 inch of steel stock, and up to 0.060 inch for other materials and applications.

The Model 680-4 is applicable to both wet and dry-belt grinding. The approximate capacity of the cooling unit, when equipped with a 1/2 horse-

## **LORCH SMALL PRECISION LATHES**

Watchmaking • Instrument • Optical  
World famous for Precision, Economy, Quality



An elaborate assortment of lathes for many purposes. For single parts as well as production. Available with large assortment of accessories such as turrets, thread cutting equipment, multiple tool slides, milling attachments, etc.

Tolerance chart will be supplied with literature.

Sole Agents:

**NEISE  
MODERN TOOLS**

**KARL A. NEISE**  
404 4th Ave., Dept. MMS,  
New York 16, N. Y.

For more data circle 493 on Reader Service Card



**SOLID TYPE**

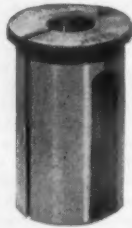
## **Hardened and Ground Tool Holder Bushings**

These new tool holder bushings are hardened and ground and priced lower than conventional soft bushings. Most sizes in stock for prompt delivery. 3/4" to 3 1/2" O.D.—any bore. Send for descriptive literature.

**THE GAHR MACHINE CO.**

19195 ST. CLAIR AVE.

CLEVELAND 19, OHIO



**SPLIT TYPE**

For more data circle 494 on Reader Service Card

*to economize*  
**STANDARDIZE**  
*with*

# RING



precision **PUNCHES** and **DIES**



Ring Standardized Punches and Dies offer cost saving dependable performance for all of your perforating problems.

Precision volume production to rigid specifications offers

- ★ Low cost
- ★ Complete interchangeability
- ★ Immediate shipments from stock on Standards plus prompt delivery on Specials
- ★ High quality — long life

**MANY SHAPES AND TYPES**



ROUND



SQUARE



OBLONG



HEXAGON



RECTANGULAR

Blanks — Pilots — Headless — Shoulder and Bevel Head Quills — Slug Ejector Punches — Transfer Punches

**NEW!**

Tough — Accurate Retainers for Ring Punches and Dies mount easily to your die set. Available in Key Type for irregular shapes.

WRITE FOR OUR ILLUSTRATED CATALOG



## RING PUNCH & DIE COMPANY

19 FENTON PLACE

JAMESTOWN, N. Y.

For more data circle 495 on Reader Service Card

August, 1956

modern machine shop 299

**new shop equipment . . .**

power coolant pump, is 100 gallons. The machine is particularly adaptable to automatic production lines. Parts can be conveyORIZED for presentation to the conveyor belt, automatically ejected and carried to the next

**STANDARDIZED  
MICRO DRILL GUIDES**

All standard body styles available with hole sizes from #80 to  $\frac{3}{32}$ ". Tolerances of .0002 maintained on I.D., O.D., and concentricity.

ENGINEERED MICRO-TOOLING, DRILLS, JIGS, COLLETS, ETC.

**MICRO  
DRILL  
GUIDE**



3980  
Superior Ave.,  
Cincinnati 36,  
Ohio

For more data circle 496 on Reader Service Card



Model  
UL 7120

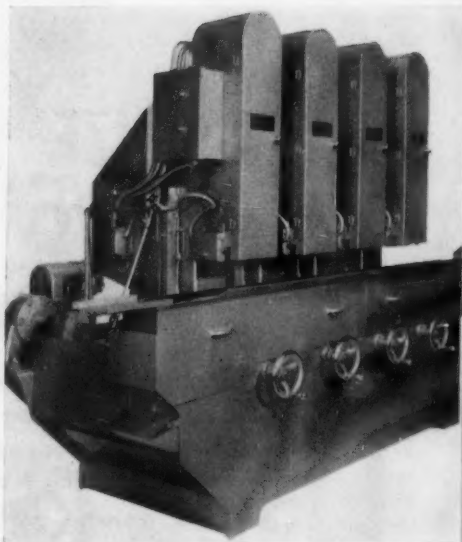
**The Leading Machine  
Tool Manufacturers  
use**

**RUTHMAN  
GUSHER**

**COOLANT PUMPS**

**THE RUTHMAN MACHINE CO.**

For more data circle 497 on Reader Service Card



**Engelberg Huller Model 680-4 Belt Machine**

operation. Size of the machine conveyor belt is  $6\frac{1}{2}$  inches by 216 feet. Quick manual adjustment of conveyor

**CENTERLESS GRINDING**

Brown & Sharpe and Swiss Automatic screw machine parts, aircraft and standard, heat treated and ground if necessary. Send blue prints for estimates. 27 years serving industry. The Porter Machine Co., Cincinnati 9, Ohio.

For more data circle 498 on Reader Service Card



**1 MINUTE**  
*to locate an edge within .0005"*  
**JUMP EDGE FINDER**

**Price \$2.50**

Complete satisfaction—or full refund  
Postage free if payment with order

**ELISHA PENNIMAN • ELMWOOD 10, CONN.**

For more data circle 499 on Reader Service Card



**NO OTHER MACHINE GIVES YOU  
THIS NEW HONING PERFECTION**

*The New Model H. M.*

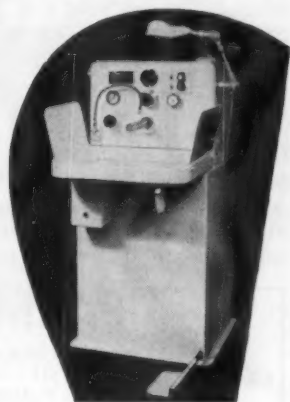
# HONEMASTER

**THE GREATEST ADVANCE IN MANUAL HONING**

- **Improved Control**
- **Greater Accuracy**
- **Infinitely Variable Speed**
- **Better Work Always**

—all yours only with this, the latest addition to the line of Superior Honing Equipment.

- Adjustable stone pressure control.
- Hydraulic system assures constant pressure with no fall off due to stone wear or stock removal. Constant cutting action always.
- Infinitely variable spindle speed 250 to 1150 rpm. The right speed and stone pressure for work of any diameter, material or finish. Easy-to-read tachometer.
- Single control sizing dial indicator shows when first piece is coming to finish size. Set, and then compensate only for stone wear thereafter.
- Hydraulic system also operates clutch and brake mechanism.
- Spindle has replaceable hardened pilot bushing, mounted on factory-sealed bearings. Eliminates constant lubrication.
- Foot and knee operating pedals.
- All standard Superior mandrels adaptable.



**SUPERIOR HONE**

**CORPORATION 1615 Elreno Street • Elkhart, Ind.**

Please send full details and prices on the Honemaster.

NAME \_\_\_\_\_  
FIRM \_\_\_\_\_  
STREET \_\_\_\_\_  
CITY AND STATE \_\_\_\_\_  
NAME OF SUPPLIER \_\_\_\_\_

For more data circle 500 on Reader Service Card

belt speed is obtainable for settings of from 2 to 25 feet per minute.

For more data circle 146 on Reader Service Card

★ ★ ★

## POWERFUL BENCH TOOL HAS VARIETY OF USES

Sheet metal shops of all kinds can make good use of a notcher that has the capacity to cut a 90 degree notch  $4\frac{1}{4}$  inches deep in 16 gauge mild steel. Such a tool is now available from Whitney Metal Tool Co., 720 Forbes St., Rockford, Ill. The blade of this new Whitney-Jensen No. 100 Hand Metal Notcher is 6 inches long on each side. It is operated by a hand lever and eccentric-pivoted link which delivers terrific cutting power to the blade through a vee-ram that has adjustable ways to insure positive blade and die alignment. Aviation-type bearings are said to reduce friction to a



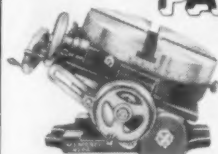
Whitney-Jensen No. 100 Hand Metal Notcher

minimum. The lower die is quickly and easily adjusted when necessary. The machine is firmly mounted on a steel table of suitable dimensions.

For more data circle 147 on Reader Service Card

## PALMGREN

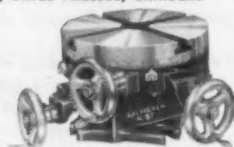
ROTARY AND INDEXING TABLES FOR  
MILLING MACHINES, DRILL PRESSES, GRINDERS



No. 84 Tilting Indexing and  
Rotary Table \$139.50



No. 86 Rotary and Indexing  
Table \$69.95



No. 83 Rotary Table for  
Vertical Milling \$79.95

64 different models and types of Palmgren vises, rotary tables, milling attachments and other machine tool accessories — the most complete line of vises and tables available anywhere. CATALOG 204

CHICAGO TOOL AND ENGINEERING CO., 8399 South Chicago Avenue, Chicago 17, Illinois

For more data circle 501 on Reader Service Card

SPECIMEN

With DYKEM Steel Blue      Without DYKEM Steel Blue

# DYKEM

## STEEL BLUE<sup>®</sup>

### Stops Losses

making Dies and  
Templates

Popular package 8-oz. can fitted with Bakelite cap holding soft-hair brush for applying right at bench; metal surface ready for layout in a few minutes. The dark blue background makes the scribed lines show up in sharp relief, prevents metal glare. Increases efficiency and accuracy.

Write for sample on company letterhead  
**THE DYKEM COMPANY**  
2301F North 11th St. • St. Louis 6, Mo.

For more data circle 502 on Reader Service Card



*Specify Adams*

for high quality gears  
made **EXACTLY** to  
your specifications

Regardless of quantity or type, you'll profit by specifying Adams custom made gears for your product. Made on the most modern gear cutting machines by skilled workmen, Adams gears are quality controlled to guarantee exact conformance to your specifications. Write today for further information. THE ADAMS COMPANY, 1942 Cypress Street, Dubuque, Iowa.

**The ADAMS Company**  
**Dubuque, Iowa, U. S. A.**

ESTABLISHED 1883

**FINE GEARS MADE TO  
YOUR SPECIFICATIONS**

For more data circle 503 on Reader Service Card



where  
to  
get it

## where to get it

**Numbers shown are page numbers of advertisements and new equipment write-ups in this issue.**

### A

**Abrasive, Grain, Cloth, Paper, Disc, etc.,** 51, 52, 57, 72, 73, 167, 189, 209, 213, 313  
**Accumulators,** 250  
**Adapters,** 211  
**Air Operated Equipment**  
 (Look for specific item)  
**Alloys,** 97, 172, 281  
**Angle Irons,** 275  
**Angles,** 204, 275  
**Arbors,** 211, 264  
**Assembling Machines, Special,** 80  
**Automated Equipment**  
 (Look for specific item)

### B

**Balancers,** 14, 15, 323  
**Bar Feeds, Automatic,** 266, 305  
**Bar Stock,** 38, 172  
**Barrels, Tumbling,** 29  
**Bases, Index,** 323  
**Bearings, Bronze,** 187  
**Bearings, Thrust,** 187, 295  
**Benches, Work,** 275  
**Bending Devices,** 221, 295  
**Bending Machines,** 257  
**Bits, Boring,** 101  
**Blades, Alloy,** 264  
**Blades, Carbide,** 172, 264  
**Blocks, Bench,** 275  
**Blocks, Step,** 212, 259  
**Blocks, Tool,** 44  
**Blocks, V,** 275  
**Bolts,** 234, 236  
**Boosters,** 250  
**Boring Bars,** 237  
**Boring and Facing Heads, Combination,** 294  
**Boring Heads,** 13, 223, 253, 294  
**Boring Machines,** 52, 155, 181, 230

**Boxes, Shop,** 227  
**Boxes, Stacking,** 227  
**Boxes, Tool,** 227  
**Boxes, Tote,** 227  
**Brakes, Magnetic,** 202  
**Brakes, Press and Bending, First Cover,** 84, 85, 144, 145, 200, 208  
**Brass Stock,** 97  
**Broaching Machines,** 8, 9, 74, 259  
**Brushes, Wire Wheel,** 213  
**Buffers, Bench and Pedestal,** 319  
**Bushings, Drill,** 66  
**Bushings, Drill Jig,** 49, 130, 173, 300  
**Bushings, Sleeve,** 187  
**Bushings, Toolholder,** 298

### C

**Cams,** 223, 260, 284  
**Carbides,** 172, 252  
**Centering Machines,** 36  
**Centers, Bench,** 323  
**Centers, Lathe, Planer, Miller, etc.,** 33, 44, 216, 218, 248, 287, 297  
**Chamfering Machines,** 257  
**Charts, Hardness,** 174  
**Charts, Milling,** 58  
**Cherrying Attachments,** 13  
**Chilling Equipment, Industrial,** 47  
**Chucking Fixtures,** 265, 278  
**Chucking and Indexing Fixtures, Combination,** 283  
**Chucks, Air and Hydraulic,** 69  
**Chucks, Collet,** 44, 141  
**Chucks, Drill,** 141, 211  
**Chucks, Lathe,** 81  
**Chucks, Magnetic,** 10, 39, 274  
**Chucks, Tap,** 141  
**Clamp Components,** 256, 259  
**Clamps,** 20, 21, 33, 34, 79, 212, 259, 261, 263, 276, 289  
**Cleaners, Machine,** 199  
**Clinometers,** 275

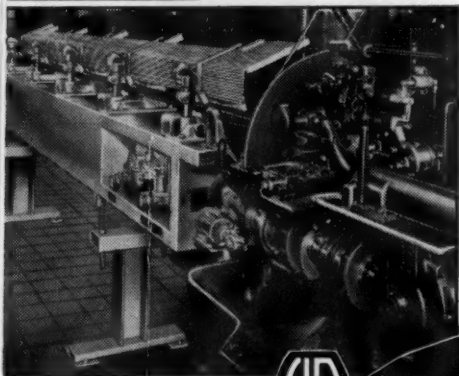
**LOSING BUSINESS**  
because of  
screw machine  
**PRODUCTION**  
**COSTS?**



**GET COMPETITIVE** with the  
**Lipe Automatic Magazine-Loading BAR FEED!**

**A.M.L. Produces 30% to 100% More  
Output by Eliminating Time Losses!**

- Automatically feeds bar stock to screw machine.
- Feeds stock to screw machine continuously, independently of operator.
- Cuts cycle time: guaranteed to attain at least 90% of machine's gross geared production capacity.
- Eliminates feed fingers . . . multiple feed finger feed-outs . . . feed finger adjustments and replacements. No jamming of remnants.
- No cutting air. No minimum or maximum run. No limit on length of feed. No selective stock length requirement.



• For full details on the Lipe A.M.L. Bar Feed, send for literature and name of nearest distributor.



**Lipe-ROLLWAY**  
CORPORATION  
SYRACUSE 1, N. Y.

**Manufacturers of Automotive Clutches & Machine Tools**



**where to get it . . .** (Numbers shown are page numbers in this issue)

Coil Handling Equipment, 26, 190, 228  
Collet, Attachments, 44  
Collet Fixtures, Indexing, 191  
Collets, 44, 191, 211, 230, 300  
Controlling Devices, 158, 229, 286  
Conveying Equipment, 315  
Coolant Units and Systems, 272  
Coolants, 199, 207  
Countersinks, 245, 290, 292  
Couplings, 261  
Cut-Off Machines, 154, 286  
Cut-Off Wheels, 209  
Cutter Sharpening Machines, 8, 9, 262  
Cutters, Gasket, Disc, etc., 295  
Cutters, Milling, 4, 186, 264  
Cutters, Special, 295  
Cutting Compounds, Liquid, 8, 9, 237  
Cutting Heads, Taper, 294  
Cylinders, Hydraulic and Pneumatic, 69, 250

**D**

Deburring Machines, 257  
Diamonds and Diamond Tools, 60, 61, 268  
Die Heads, 81, 202  
Die Making Machines, 65  
Die Sets, 26, 175  
Die Stock, 43  
Diemakers' Supplies, 302  
Dies, Punching or Forming, 32, 78, 81, 172, 299, 311  
Dividing Heads, 176, 242, 245  
Dollies, 156  
Dressers, Grinding Wheel, 33, 34, 314  
Dressing Fixtures, Grinding Wheel, 260, 263  
Drill Heads, 131, 170, 248  
Drill Sharpening Fixtures, 256  
Drilling Attachments, 44, 71  
Drilling, Boring and Tapping Machines, Combination, 67  
Drilling Machines, Automatic, 278, 283, 317  
Drilling Machines, Bench, 317  
Drilling Machines, Duplex, 292  
Drilling Machines, Horizontal, 285  
Drilling Machines, Magnetic, 19, 20  
Drilling Machines, Multiple Spindle, 87, 181  
Drilling Machines, Radial, 35, 71, 131  
Drilling Machines, Upright, 71, 131, 135

Drilling Machines, Sensitive, 135, 307  
Drilling Machines, Vertical, 87  
Drilling, Milling and Tapping Units, Combination, 279  
Drilling and Tapping Machines, Combination, 283  
Drilling Units, 184  
Drills, Center, Core, Twist, etc., 241, 245, 278, 297  
Drills, Portable Electric, 20, 21, 71, 213  
Duplicating Machines, 75  
Dust Control Equipment, 188, 244, 258, 319  
Dye Penetrant Kits, 178

**E**

Edge Finders, 300  
End Mills, 264  
Engraving Machines, 83  
Etchers, 240

**F**

Feed Units, 56, 80, 236, 277, 305  
Feeds, Roll, 190  
Filing Machines, 218  
Filters, 169, 273  
Fittings, Air Line, 224  
Flame Hardening Apparatus, 8, 9  
Flexible Shaft Equipment, 71, 213  
Fluids, Hydraulic, 76, 77  
Flywheels, 264  
Forming Attachments, 291  
Forming Machines, 8, 9, 29, 56, 233  
Furnaces, Heat Treating, 91, 203, 204, 263, 293

**G**

Gage Blocks, 221, 249  
Gages, 6, 10, 28, 43, 140, 179, 183, 264, 270, 271, 282, 293  
Gear Hobbing Machines, 137  
Gear Testing Machines, 285  
Gears and Gear Units, 241, 303, 309  
Generators, 272  
Grinders, Abrasive Band and Belt, 240, 256, 298  
Grinders, Air, 150, 226, 239  
Grinders, Automatic, 65, 193  
Grinders, Bench, 213, 319  
Grinders, Cam, 223  
Grinders, Carbide Tool, 240

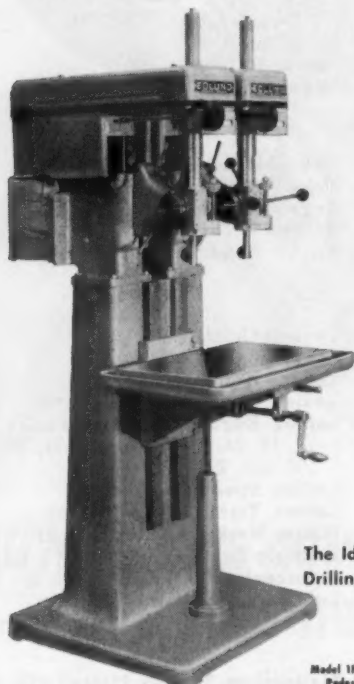
# EDLUND

## Sensitive Drilling Machine

### MODEL 1F

*Infinitely Variable Speed*

*10,000 R.P.M.*



Model 1F-2 Spindle  
Pedestal Type

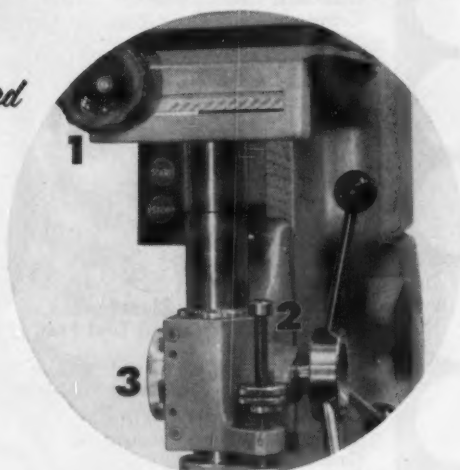
#### SPECIFICATIONS

Overhang .....	7"
Capacity (Cast Iron) .....	3/8"
#1 Morse Taper or Jacobs Chuck .....	D-1/2"
Speed Range — Optional	
A25 to 5000 R.P.M.	
1250 to 10000 R.P.M.	

Spindles — 1 to 6  
Pedestal and Bench Types

Send for Free Illustrated Bulletin #160

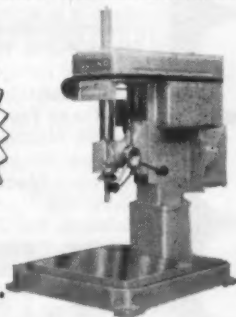
**EDLUND**  
**MACHINERY COMPANY**  
Corland, New York  
Division of Horco Corporation



- 1 INFINITELY VARIABLE SPEED CONTROL**  
Simply turn knob for any speed within range of the machine. Swift, powerful, and positive action.
- 2 MICROMETER GRADUATED DEPTH GAUGE**  
Permits accurate pre-set depth control for all precision production drilling. Clearly graduated to .001".
- 3 ADJUSTABLE SPINDLE TENSION CONTROL**  
Compensates for different drilling conditions. Three handle feed lever reduces worker fatigue.

The Ideal Drilling Machine for High Speed Sensitive Drilling of Small Parts, Light Assemblies, and Instrumentation.

*America's  
Most  
Popular  
Drilling  
Machine*



Model 1F-1 Spindle  
Bench Type

EDLUND REPRESENTATIVES IN MAJOR CITIES

For more data circle 505 on Reader Service Card

**where to get it . . .** (Numbers shown are page numbers in this issue)

Grinders, Centerless, 62  
 Grinders, Cutter and Tool, 65, 93, 125, 205  
 Grinders, Cylindrical, 44, 62, 72, 73  
 Grinders, Disc, 319  
 Grinders, Drill, 65, 256, 319  
 Grinders, Face, 255  
 Grinders, Face Mill, 65  
 Grinders, Gear, 62, 281  
 Grinders, Hand, 125  
 Grinders, Internal, 193, 319  
 Grinders, Jig, 78  
 Grinders, Miller, 273  
 Grinders, Pedestal, 227, 319  
 Grinders, Portable Electric, 213  
 Grinders, Portable and Tool Post, 319, 324  
 Grinders, Profile, 8, 9  
 Grinders, Saw, 210  
 Grinders, Snagging, 319  
 Grinders, Special Purpose, 62  
 Grinders, Spline, 62  
 Grinders, Surface, 10, 45, 59, 82, 125, 167, 192, 295  
 Grinders, Swing Frame, 294  
 Grinders, Template Tool, 65  
 Grinders, Tool Post, 75  
 Grinders, Universal, 18, 19, 245  
 Grinders, Wet, 319  
 Grinding Fixtures and Attachments, 201, Third Cover  
 Grinding Heads, 78  
 Grinding Wheels, 51, 52, 59, 72, 73, 167

## H

Hammers, Hand, 294  
 Hand Tools, Power  
 (Look for specific item)  
 Hardening Compounds, 280  
 Hardness Testing Devices, 63, 174, 231  
 Heads, Milling and Splining, 131, 294  
 Hinges, 232  
 Hobbing Machines, 137  
 Hobs, 185  
 Holders, Bit, 37  
 Holders, Floating, 231  
 Holders, Indicator, 225  
 Holders, Tool, 44, 88, 101, 163, 191, 231, 244  
 Honing Machines, 269, 301  
 Hydraulic Equipment  
 (Look for specific item)

## I

Indicators, 6, 43, 183, 225  
 Ink, Layout, 276  
 Inserts, Carbide, 226  
 Inspection Devices, 28, 68, 247

## J

Jig Borers, 87, 219, 241, 296  
 Jig Mills, 149  
 Jigs and Fixtures, 300  
 Jointers, 71

## K

Keys, Machine, 219, 246, 271  
 Keys, Woodruff, 219, 246  
 Keyway Cutting Machines, 247  
 Knives, Band, 43  
 Knobs, Hand, 259, 276

## L

Ladling Units, 270  
 Lapping Machines, 10, 130, 194  
 Lathes, Automatic, 14, 15, 31  
 Lathes, Duplicating, 18, 19, 95  
 Lathes, Engine and Toolroom, 14, 15, 18, 19, 24, 25, 40, 41, 55, 71, 89, 95, 195, 205, 298  
 Lathes, Speed, 243  
 Lathes, Turret, 14, 15, 241, 288  
 Lifting Machinery, Portable, 215  
 Lighting Equipment, 214  
 Lubricants, 128, 129, 207, 219, 267  
 Lubricating Systems, 235

## M

Magnesium Tooling Plate, 16, 17  
 Magnets, Lifting, 294  
 Magnifiers, 239  
 Mandrels, Lathe, 211  
 Manuals, Torque Wrench, 236  
 Marking Devices, 83, 212, 223, 240, 252, 272, 287, 291, 321  
 Measuring Instruments, Optical, 68, 287  
 Measuring Machines, Optical, 68  
 Metallizing Equipment, 171, 210  
 Milling Attachments, 268, 273  
 Milling Machine Attachments, 13, 44, 211, 302

**IT'S NEW**

IT LISTS ALL PRODUCTS

COMPLETE CATALOG

NO. **56**



**REPLACES  
Catalogs**

**No. 55**

**No. NP-55**

**No. R-56**

## **NOW - IN ONE COMPLETE CATALOG - ALL THE LATEST INFORMATION**

on the bigger-than-ever BOSTON GEAR line. Lists hundreds of new products—new models—new sizes. Get your copy—it's your indispensable guidebook to new efficiency, new economy in power transmission. Boston Gear Works, 68 Hayward Street, Quincy 71, Massachusetts.

**LOCAL STOCKS  
FACTORY PRICES**

*Call your* **BOSTON** *Gear*  
**DISTRIBUTOR**

For more data circle 506 on Reader Service Card

August, 1956

modern machine shop 309

**where to get it . . .** (Numbers shown are page numbers in this issue)

Milling Machines, Automatic, 8, 9, 273  
 Milling Machines, Cam, 223, 241  
 Milling Machines, Horizontal, 42, 62,  
 75, 195, 205  
 Milling Machines, Turret, 13  
 Milling Machines, Universal, 30, 62,  
 205  
 Milling Machines, Vertical, 30, 62, 75  
 Mills, Face, 264  
 Mountings, Cylinder, 266

## N

Nibblers, 219, 227  
 Notching Machines, 265  
 Notching Units, 302  
 Nut Setters, 37

## O

Oilstones, 157  
 Oils, Cutting, Second Cover  
 Oils, Grinding, Second Cover  
 Oils, Hydraulic, Second Cover  
 Oils, Soluble, Second Cover  
 Ovens, 293

## P

Pads, Pusher, 254  
 Pans, Tote, 284  
 Pantographs, 75, 218  
 Parallels, 204, 275  
 Parts, Machine Tool, Production, Air-  
 craft, etc., 271  
 Penetrators, Diamond, 63  
 Pins, Dowel, Taper, etc., 130, 219, 242,  
 246, 255, 271  
 Pipe Fittings, 224, 251  
 Plates, Angle, 204, 241, 275  
 Plates, Bench, 275  
 Plates, Floor, 275  
 Plates, Lapping, 275  
 Plates, Surface, 204, 275  
 Pointers, Bar, 292  
 Polishing Machines, 213  
 Presses, Air, 180, 206  
 Presses, Hydraulic, 78, 86, 177, 182  
 Presses, Power, 250, 311  
 Presses, Punch, 256  
 Presses, Straightening, 263  
 Pumps, Air, 69  
 Pumps, Coolant and Lubricant, 44,  
 300  
 Pumps, Hydraulic, 90

Punch Press Sets, 212  
 Punches, 173, 284, 299, 311

## Q

Quills, 273

## R

Racks, Machine, 219  
 Reamers, 168, 198, 206, 267  
 Reels, 56  
 Refractories, 50, 51, 72, 73, 167  
 Riveting Machines, 219, 225  
 Rust Preventatives, 207

## S

Saw Blades, Band, 249, 266  
 Saw Blades, Hack, 11, 200  
 Saw Blades, Hole, 213  
 Saw Blades, Slitting, 261  
 Saw Blades, Slotting, 261  
 Saw Sharpening Machines, 210  
 Sawing Machines, Arbor, 71  
 Sawing Machines, Band, 43, 71, 218,  
 229, 249, 254, 275, 296  
 Sawing Machines, Radial, 71  
 Saws, Hand, 43, 200, 213  
 Saws, Jig, 71  
 Saws, Power, 249  
 Scrap Cutting Machines, 259  
 Scrap Handling Equipment, 315  
 Scrapers, Power and Hand, 3  
 Screw Drivers, Hand, 37  
 Screw Driving Machines, Power, 80  
 Screw Inserting Machines, Auto-  
 matic, 75  
 Screw Machines, Automatic, 70  
 Screws, Cap, Set, Socket, and Ma-  
 chine, 7, 22, 23, 236, Fourth Cover  
 Screws, Transfer, 252, 297  
 Seals, Pipe, 251  
 Separators, Magnetic, 169, 273  
 Services: Milling, Grinding, Lapping,  
 Rebuilding, Repairing, Business,  
 etc., 156, 260, 284, 287, 296, 300  
 Shapers, 195, 255  
 Sharpening Machines, Tool, 5  
 Shearing Machines, 64, 151, 192, 222  
 Shearing, Punching, and Coping  
 Machines, Combination, 64  
 Shears, Rotary, 64  
 Shears, Squaring, 84, 85, 99





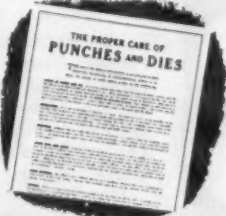
## ***In stock* 400 sizes of 21 standard CLEVELAND PUNCHES!**

For your convenience we carry 400 sizes of our 21 standard punches and matching dies in stock. Punching diameters range from  $\frac{5}{32}$ " to  $1\frac{1}{2}$ ". You will get prompt shipment of any standard punch. Special sizes or shapes will be made to your specifications.

Don't overlook the savings offered by the Cleveland system of standardization. You can punch any size hole from  $\frac{1}{8}$ " to  $1\frac{1}{16}$ " by using the same coupling nut and punch stem.

*Are you obtaining maximum service from your Punches and Dies? Protect tool life—send for copies of our two-color wall instruction chart, "Proper Care of Punches and Dies."*

A-5169



**THE CLEVELAND PUNCH & SHEAR WORKS CO. U.S.A.**  
Established 1880

**PUNCHING TOOLS & DIES**

OFFICES AT:  
NEW YORK... CHICAGO  
DETROIT... PHILADELPHIA  
E. LANSING

**POWER PRESSES**

**FABRICATING TOOLS**

CLEVELAND 14, OHIO

For more data circle 507 on Reader Service Card

**where to get it . . .** (Numbers shown are page numbers in this issue)

Shears, Universal, 64, 99  
 Shelving, 235  
 Shims, 269  
 Sine Bars, 34  
 Sine Plates, 28, 292  
 Sleeves, 230  
 Slotting Machines, 273, 292  
 Socket Sets, 37  
 Sockets, 230  
 Spanners, 279  
 Special Machinery, 223  
 Speed Reducers, 241  
 Spindles: Grinding, Boring, Milling,  
 etc., 130, 220  
 Squares, 12  
 Steel, Air Hardened, 249  
 Steel, Alloy, 38  
 Steel, Cold Finished, 38  
 Steel, Die, 249  
 Steel, High Speed, 101, 165, 217  
 Steel, Hot Rolled, 249  
 Steel, Oil Hardened, 249  
 Steel Sheets, 38  
 Steel, Special Purpose, 217  
 Steel, Stainless, 38  
 Steel, Tool, 32, 38, 143, 219, 249  
 Stops, Lathe, 44  
 Straightedges, 275  
 Straightening Machines, 56, 190  
 Stud Sets, 212, 259  
 Studs, 236  
 Superfinishing Machines, 14, 15  
 Surfacing Machines, Abrasive, 71  
 Switches, 297

## T

Table, Accessories, 233  
 Tables, Checking, 275  
 Tables, Compound, 223  
 Tables, Elevating, 139, 148, 223  
 Tables, Milling and Grinding, 28  
 Tables, Reading, 275  
 Tables, Rotary and Index, 78, 223,  
 241, 242, 244, 302  
 Tables, Universal, 44  
 Tap Drivers, 198  
 Tap Reconditioning Machines, 54  
 Tapes, Measuring, 43, 50, 51, 72, 73,  
 167  
 Tappers, Automatic, 277  
 Tapping Attachments, 211, 248, 254  
 Tapping Heads, 242, 248, 254

Tapping Machines, 181  
 Taps, 36, 81  
 Templates, 263  
 Thinners, Drill Point, 65  
 Thread Checking Instruments, 36, 44  
 Thread Milling Machines and Cutters,  
 36  
 Threading Attachments, 196, 197  
 Threading Machines, 2, 292  
 T-Nut and Stud Sets, 212  
 Tool Bits, 48  
 Tools, Boring, 264  
 Tools, Carbide, 172, 179, 273, 288  
 Tools, Chucking, 163  
 Tools, Cutting, 249, 288  
 Tools, Cutting-Off, 232  
 Tools, Deburring, 232, 290  
 Tools, Diamond, 60, 61  
 Tools, Dressing, 60, 61  
 Tools, Fabricating, 311  
 Tools, Grinding, 273  
 Tools, Grooving, 159  
 Tools, Magnetic, 37  
 Tools, Measuring, 43  
 Tools, Peening, 46  
 Tools, Radius, 60, 61  
 Tools, Rotary, 273  
 Tools, Special Cutting, 130  
 Tools, Threading, 60, 61  
 Tools, Trepanning, 53  
 Tools, Turning, 27  
 Tools, Turret Lathe, 27  
 Tracers, Lathe, 13, 24, 25  
 Transfer Processing Machines, Auto-  
 matic, 78  
 Turning Attachments, 196, 197  
 Turning Machines, 27  
 Turret Attachments, 44  
 Turrets, Lathe, Tool Post, Bed and  
 Tailstock, 44, 280

## V

Valves, 69, 90, 190  
 Vises, Bench and Machine, 20, 21, 33,  
 34, 211, 234, 258, 302

## W

Welding Equipment and Supplies,  
 225, 279  
 Wrenches, 37  
 Wrenches, Impact, 213  
 Wrenches, Torque, 236

*Rubber-Cushioned*

# NEW WHEELS...

**Multi-Use  
STOCK ABRASIVES**  
*that also do the  
work of "specials"!*

**A NEW, WIDER CONCEPT IN  
FINISHING, REPLACING  
COSTLIER, SLOWER METHODS**

These readily available wheels, new in grains and textures, augment still further the almost unbelievable finishing range of Brightboy rubber-cushioned abrasives. Brightboy uses are broader and far beyond the conventionally-accepted scope of abrasive applications.

Brightboy's unique *abrasive-and-rubber* action **BURRS, CLEANS, FINISHES, POLISHES**, frequently **IN ONE OPERATION**; replaces costlier, slower methods.



- **READILY-AVAILABLE STOCK NUMBERS, "JOB-MATCHED" TO PARTICULAR APPLICATIONS, ALSO DO "USUAL" JOBS.**
- **WIDE CHOICE OF GRAINS AND TEXTURES.** Silicon carbide and Aluminum Oxide Grains, *each* in combinations of grain sizes and textures from extra fine to extra coarse, in soft, firm and tough rubber binders.

Brightboy rubber-cushioned abrasives will find many regular and special uses in your production. Ask your dealer to recommend the Brightboy grains and textures for your present and contemplated work. Ask him for the new Brightboy catalog listing work applications and machine speeds. Write us if he cannot supply you, or on any problem in which finishing is involved.

**BRIGHTBOY INDUSTRIAL DIVISION  
WELDON ROBERTS RUBBER CO.**

95 North 13th Street • Newark 7, N. J.

*America's Pioneer Manufacturer  
of Rubber-Bonded Abrasives*

For more data circle 508 on Reader Service Card



## the right dresser for **EVERY WHEEL**



Only Desmond can furnish you with the correct dresser for each type grinding wheel. Some are shown above, left to right:

**For large coarse wheels**—the Desmond Heavy Duty, in two sizes.

**For abrasive belts and drums**—the Desmond Beltbrasive, in three sizes.

**For general utility**—the Desmond Huntington, in three sizes.

**For precision work**—Desmond diamond hand tools.

**For fine work**—Desmond Ball Bearing Precision, which does the work of diamonds in many applications.

**Also**—Desmond Hex, Desmond Rearwin, Desmond Sherman, Desmond Diamo-Carbo, Desmond diamond nibs for all makes of grinders, Desmond Crackerjack—and special dressers and cutters for unusual applications.

Write for new Desmond Dresser Catalog, and name of your nearest Industrial Distributor.

THE ONLY COMPLETE LINE OF GRINDING WHEEL DRESSERS AND CUTTERS

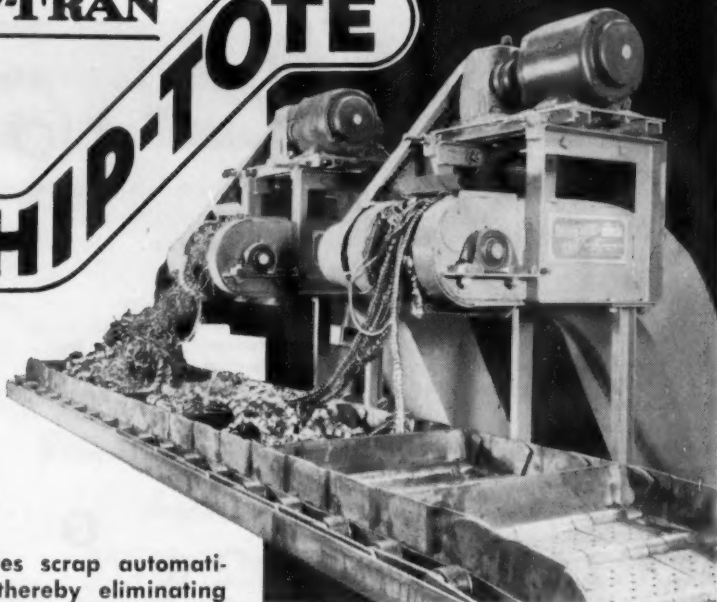
# Desmond

THE DESMOND-STEPHAN MFG. CO., URBANA, OHIO

For more data circle 509 on Reader Service Card

# MAY-FRAN

# CHIP-TOTE

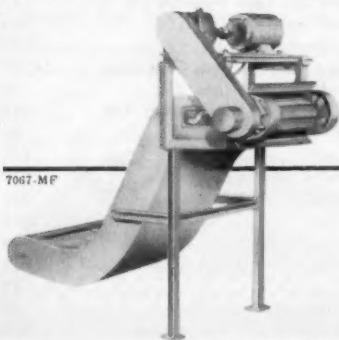


- ★ Removes scrap automatically thereby eliminating machine down-time.
- ★ Reduces materials handling time and cuts operating costs.
- ★ STEP-UP PRODUCTION of machine tools . . . more production means greater profits!

● No matter how you measure costs or profits . . . if you can reduce machine down-time, both figures will improve.

NOW . . . MAY-FRAN gives you the answer to manual scrap removal. Continuous removal of chips, turnings and borings from operating automatics or multiple spindle machines is possible with a CHIP-TOTE. Scrap is funneled onto the CHIP-TOTE hinged-steel conveyor belt and carried clear of the machine and then transported up an incline for discharge.

*There is a PAY-OFF for automatic scrap removal. Write today . . . ask for Catalog MF-640.*



# MAY-FRAN

## ENGINEERING, INC.

1708 Clarkstone Road • Cleveland 12, Ohio

For more data circle 510 on Reader Service Card

August, 1956

modern machine shop 315



## index to advertisements

**For listing of products offered by  
these advertisers consult the  
Where To Get It Section.**

**A**

AA Gage Co. ....	12
Aaron Mchry Co., Inc. ....	205
Accurate Bushing Co. ....	173
Ace Drill Bushing Co. ....	66
Acme Tool Co. ....	244
Adams Co. ....	303
Adjustable Clamp Co. ....	276
Aetna Mfg. Co. ....	272
Aget Mfg. Co. ....	188
Albertson & Co., Inc. ....	213
Allegheny Ludlum Steel Corp. ....	32
Allison Div., American Chain & Cable Co. ....	209
American Brass Co. ....	97
American Chain & Cable Co. ....	63, 209
American Cystoscope Makers, Inc. ....	247
American Drill Bushing Co., Inc. ....	49
Ames Co., B. C. ....	183
Anderson Bros. Mfg. Co. ....	3
Apex Machine & Tool Co. ....	37
Armco Steel Corp. ....	165
Armstrong-Blum Mfg. Co. ....	11
Armstrong Bros. Tool Co. ....	101
Auto Moulding & Mfg. Co. ....	232

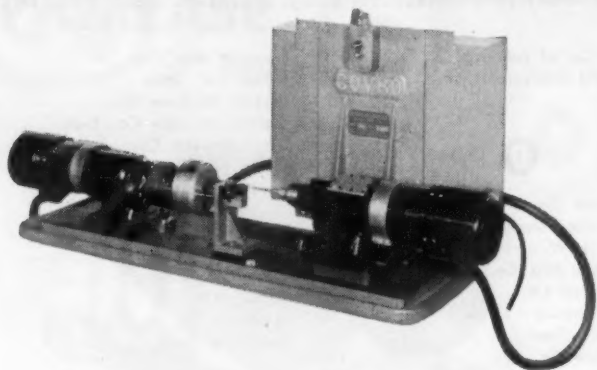
**B**

B & E Mfg. Co. ....	240
B & W Precision Products Co. ....	186
Baird Machine Co. ....	29
Bald Eagle Tool Co. ....	292
Behr-Manning, Div. of Norton Co. ....	157
Bellows Co. ....	125
Beverly Shear Mfg. Co. ....	222
Black Drill Co. ....	278
Blue M Electric Co. ....	293
Blanchard Machine Co. ....	59
Boston Gear Wks. ....	309

Boyar-Schultz Corp. ....	234
Brewster-Squires Co. ....	240
Bridgeport Machines, Inc. ....	13
Bryant Mchry. & Engr. Co. ....	87
Buck Mfg. Co. ....	20, 21
Buckeye Tools Corp. ....	189
Bullard Co. ....	155
Bunting Brass & Bronze Co. ....	187

**C**

Capewell Mfg. Co. ....	143
Carroll Dividing Head Co. ....	245
Cerro de Pasco Corp. ....	281
Challenge Mchry. Co. ....	275
Chicago Mfg. & Dist. Corp. ....	219
Chicago Screw Co. ....	7
Chicago Tool & Engr. Co. ....	302
Cincinnati Bickford Div., Giddings & Lewis Machine Tool Co. ....	131
Cincinnati Electrical Tool Co. ....	324
Cincinnati Milling Machine Co. ....	8, 9
Cincinnati Shaper Co. ....	144, 145
Cincinnati Sub-Zero Products Co. ....	47
Cincinnati Tool Co. ....	263
Clark Instrument, Inc. ....	174
Cleereman Machine Tool Corp. ....	87
Cleveland Crane & Engr. Co. ....	99
Cleveland Punch & Shear Wks. Co. ....	311
Cogsdill Tool Products Co. ....	46
Collis Co. ....	230
Commander Mfg. Co. ....	277
Commercial Centerless Grinding Co. ....	242
Comfor Co. ....	282
Cook, Inc., L. H. ....	294
Covel Mfg. Co. ....	68
Cross Co. ....	52
Cross & Son, Herbert ....	297
Crown Industrial Products Co. ....	276



## **New Machine Performs 3 Operations Automatically With One Loading**

If you are faced with the problem of speeding up the drilling of small parts, it will be to your advantage to acquaint yourself with this new bench-type drilling machine which incorporates 2 Govro-Nelson Automatic Drilling Units, one with a 2-spindle head, originally designed for drilling and counterboring an aluminum collar.

The operator loads and clamps the part in a simple fixture, then depresses the start-cycle switch, whereupon the left-hand drilling unit automatically feeds forward and drills two holes. The withdrawal of the spindles causes the right-hand unit to feed in automatically to counterbore one of the two holes previously drilled.

With this simple set-up, the three operations are performed automatically at an output rate in excess of 300 pieces per hour.

By making slight changes in mounting and fixtures, the machine is readily adaptable to drilling a variety of parts. Send for complete information.

### **GOVRO-NELSON CO.**

*Machinists of Precision Parts for 33 Years*

**1933 Antoinette  
Detroit 8, Mich.**

*Automatic* **DRILLING UNIT**

For more data circle 511 on Reader Service Card

**index to advertisements...**(For listings of products consult Where To Get It Section)

Crucible Steel Co. of America .....217  
Custom Scientific Instruments, Inc. ....242

**D**

Davis Boring Tool Div.,  
    Giddings & Lewis Machine Tool Co. ....88  
Dearborn Co., J. W. ....283  
Desmond-Stephan Mfg. Co. ....314  
Detroit Boring Bar Co. ....237  
Detroit Power Screwdriver Co. ....80  
Detroit Reamer & Tool Co. ....201  
DeVlieg Machine Co. ....149  
DoAll Co. ....249  
Dow Chemical Co. ....16, 17  
Dreis & Krump Mfg. Co. ....200  
duMont Corp. ....48  
Dykem Co. ....302

**E**

Eastern Centerless Grinding Co. ....156  
Economy Engr. Co. ....215  
Edlund Mchry. Co. ....307  
Edroy Products Co. ....239  
Eisler Engr. Co., Inc. ....241  
Electro-Mechano Co. ....184  
Elgin National Watch Co. ....268  
Enco Mfg. Co. ....280  
Essex Rotary File & Tool Co. ....288  
Ex-Cell-O Corp. ....130

**F**

Federal Press Co. ....180  
Federal Products Corp. ....6  
Firearms Int'l. Corp. ....279, 289  
Foote-Burt Co. ....74  
Fulflo Specialties Co., Inc. ....90

**G**

Gahr Machine Co. ....298  
Gallmeyer & Livingston Co. ....93  
Gammons-Hoaglund Co. ....168  
Gay-Lee Co. ....261

General Mfg. Co. ....263  
Gillen Co., John ....271  
Gisholt Machine Co. ....14, 15  
Gorton Machine Co., Geo. ....75  
Govro-Nelson Co. ....317  
Grant Mfg. & Machine Co. ....225  
Graphic Systems ....229  
Greaves Machine Tool Co. ....58  
Greenerd Arbor Presses ....182  
Greenlee Bros. & Co. ....70  
Greenlee Tool Co. ....221  
Greist Mfg. Co. ....270  
Grob, Inc. ....218  
Gwilliam Co. ....295

**H**

Hamilton Tool Co. ....135, 137, 139  
Hammond Mchry. Builders, Inc. ....227  
Hanchett Magna-Lock Corp. ....39  
Hanson-Whitney Co. ....36  
Hardinge Brothers, Inc. ....30  
Hartmann Mfg. Co. ....234  
Haskins Co., R. G. ....150  
Heald Machine Co. ....5  
Heimann Mfg. Co. ....252  
Hendey Machine Div.,  
    Barber-Colman Co. ....40, 41  
Hi-Duty Drill Wks. ....297  
Himoff Machine Co., Inc. ....284  
Hisey-Wolf Machine Co. ....319  
Holo-Krome Screw Corp. ....Fourth Cover  
Horton Chuck ....81  
Hy-Pro Tool Co. ....164a

**I**

Ideal Industries, Inc. ....216  
Industrial Electronics, Inc. ....158  
Industrial Filtration Co. ....169

**J**

J & S Tool Co., Inc. ....33, 34  
Jaco Devices, Inc. ....259  
Jacobs Mfg. Co. ....141  
Johnson Machine & Press Corp. ....164d

# NEW GREASE

improves



## **Hisey** PRECISION GRINDERS

After thorough tests a new type grease has been adopted for HISEY Precision Grinders. The Internal and External Spindles have been redesigned for grease instead of the oil mist which we used for so many years.

Some of the resulting advantages are:

- Spindle can be operated at any angle and in any position.
- Bearings need no further lubrication for 5000 hours.
- Spindles operate at lower temperatures.
- Fewer parts are required in new design and seals are more effective.

**ASK FOR CATALOG 72 SB**



**Other HISEY Products: Bench and Pedestal Grinders and Buffers;  
Snagging Grinders; Wet Tool Grinders; Disc Grinders;  
Drill Grinders and Dust Collectors.**

For more data circle 512 on Reader Service Card

**index to advertisements...**(For listings of products consult Where To Get It Section)

**K**

Kalamazoo Tank & Silo Co. ....	266
Kasent Co. ....	280
Kaukauna Machine & Foundry Div., Giddings & Lewis Machine Tool Co. ....	67
Kearney & Trecker Corp. ....	42
Kent Machine Co. ....	292
Keo Cutters ....	245
Kidde Precision Tool Corp. ....	260, 296
Kling Bros. Engr. Wks. ....	64

**L**

Laminated Shim Co., Inc. ....	269
Landis Machine Co. ....	2
LeBlond Machine Tool Co., R. K. ....	24, 25
Lempco Industrial, Inc. ....	177
Lindberg Engr. Co. ....	91
Linley Bros. Co. ....	219
Lipe-Rollway Corp. ....	305
Littell Machine Co., F. J. ....	190
Lodging, Inc. ....	79
Lodge & Shipley Co. ....	95
Logansport Machine Co., Inc. ....	69
Lovejoy Tool Co. ....	264
Lubriplate Div., Fiske Bros. Refining Co. ....	267
Lucas & Sons, Inc., J. L. ....	284

**M**

M.B.I. Export & Import, Ltd. ....	211
Macco Products Co. ....	207
Machine Products Corp. ....	204
Madison-Kipp Corp. ....	226
Manhattan Supply Co. ....	218
Mattison Machine Wks. ....	82
Maxwell Co. ....	291
May-Fran Engr., Inc. ....	315
Metal Carbides Corp. ....	172
Metallizing Engr. Co., Inc. ....	171
Mettler Machine Tool, Inc. ....	286
Michigan Chrome & Chemical Co. ....	178
Micro Drill Guide ....	300
Mighty Mover Co. ....	156
Miller Fluid Power Div., Flick-Reedy Corp. ....	250
Morris Machine Tool Co. ....	35
Morrison Co., D. C. ....	247
Notch & Merryweather Mchry. Co. ....	199
Mummert-Dixon Co. ....	294

**N**

National Acme Co. ....	196, 197
National Automatic Tool Co., Inc. ....	181
Nebel Machine Tool Corp. ....	55
Neise, Karl A. ....	253, 256, 294, 298
New Albany Machine Mfg. Co. ....	206
New Hermes Engraving Machine Corp. ....	83
New Method Steel Stamps, Inc. ....	224
Niagara Machine & Tool Wks. ....	84, 85
Nichols-Morris Corp. ....	176
Nielsen, Inc. ....	248
Nielsen Tool & Die Co. ....	297
Nilson Machine Co., A. H. ....	56
Northwestern Tool & Engr. Co. ....	212
Norton Co. ....	50, 51, 72, 73, 167
Numberall Stamp & Tool Co. ....	287
Nu-Tangs, Inc. ....	296

**O**

OK Tool Co., Inc. ....	4
Oliver Instrument Co. ....	65
Olson Industrial Products Co. ....	241
O'Neil-Irwin Mfg. Co. ....	151
Oslund Precision Products ....	225
Ottmiller Co., Wm. H. ....	236

**P**


Peaslee Metal Products Co. ....	253
Penniman, Elisha ....	300
Pines Engr. Co., Inc. ....	257
Porter Machine Co. ....	300
Pratt & Whitney Co., Inc. ....	179
Precise Products Corp. ....	273
Precision Tool & Mfg. Co. ....	221
Procurier Safety Chuck Co. ....	254
Pyrometer Instrument Co. ....	287


**R**

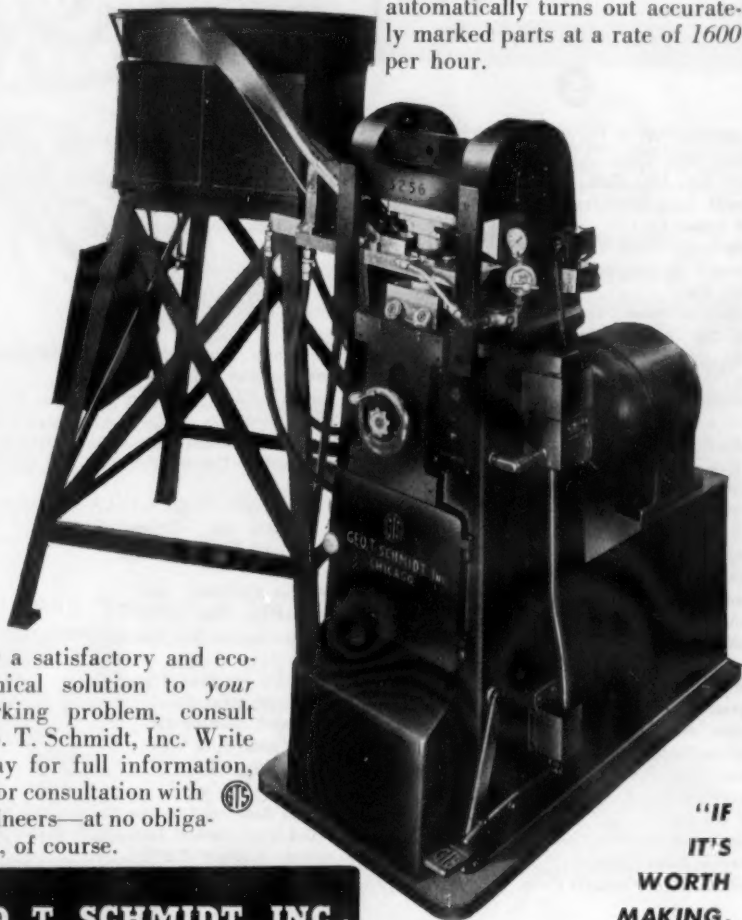
Raymond Corp. ....	148
Reid Tool Supply Co. ....	259
Richards Co., J. A. ....	295
Ring Punch & Die Co. ....	299
Rivett Lathe & Grinder, Inc. ....	89




## EVER HAVE A MARKING PROBLEM LIKE THIS?

Every day,  engineers accept challenges like this one: designing a machine to mark irregularly shaped parts—clearly, accurately, rapidly, and *automatically*.

The answer was the  unit shown here. It loads for a 30 minute run, automatically turns out accurately marked parts at a rate of 1600 per hour.



For a satisfactory and economical solution to *your* marking problem, consult Geo. T. Schmidt, Inc. Write today for full information, or for consultation with engineers—at no obligation, of course. 

**GEO. T. SCHMIDT, INC.**

1806 West Belle Plaine Avenue  
Chicago 13, Illinois

**"IF  
IT'S  
WORTH  
MAKING,  
IT'S WORTH  
MARKING."**

For more data circle 513 on Reader Service Card

# **index to advertisements...**(For listings of products consult *Where To Get It* Section)

Robbins Co., Omer E. ....	28
Roberts Rubber Co., Weldon ....	313
Rockford Die & Tool Wks., Inc. ....	54
Rodgers Hydraulic, Inc. ....	86
Rowbottom Machine Co. ....	223
Royal Oak Tool & Machine Co. ....	Third Cover
Ruthman Mchry. Co. ....	300

Thompson Grinder Co. ....	45
Thriftmaster Products Corp. ....	248
Tietzmann Tool Corp. ....	259, 276
Torit Mfg. Co. ....	258
Troyke Mfg. Co. ....	244
Tru-Seal Div., Flick-Reedy Corp. ....	251
Twentieth Century Mfg. Co. ....	198

## **S**

Savage Co., W. J. ....	227
Schauer Mfg. Corp. ....	243
Scherr Co., Inc., Geo. ....	221, 285
Schmidt, Inc., Geo. T. ....	321
Scott Paper Co. ....	164b, 164c
Scully-Jones & Co. ....	163
Seneca Falls Machine Co. ....	31
Sentry Co. ....	203
Sheldon Machine Co., Inc. ....	195
Shell Oil Co. ....	76, 77
Simonds Abrasive Co. ....	57
Skee Tool Co. ....	232
Skinner Chuck Co. ....	265
Smith & Mills Shaper Div., Nebel Machine Tool Corp. ....	255
Smith & Sons, Geo. W. ....	225
Somerset Tool Co. ....	263
South Bend Lathe Wks. ....	44
Spellman Co., R. L. ....	284
Sperman Metal Specialties ....	260
Springfield Machine Tool Co. ....	18, 19
Standard Electrical Tool Co. ....	220
Standard Gage Co. ....	140
Standard Horse Nail Corp. ....	246
Standard Pressed Steel Co. ....	22, 23, 235
Standard Steel Specialty Co. ....	219
Starrett Co., The L. S. ....	43
Stearns Magnetic, Inc. ....	202
Sterling Factory Equipment Co. ....	227
Stevens, Inc., John B. ....	223
Sturtevant Co., P. A. ....	236
Sun Oil Co. ....	128, 129
Sundstrand Machine Tool Co. ....	323
Superior Hone Corp. ....	301
Superior Steel Products Corp. ....	175

## **U**

Union Twist Drill Co. ....	185
U. S. Drill Head Co. ....	170
U. S. Steel Corp. ....	38
U. S. Tool Co., Inc. ....	26
Up-to-Date Tool Co. ....	256

## **V**

Vaill Engr. Co. ....	233
Van Norman Machine Co. ....	62
Verson Allsteel Press Co., Inc. ....	First Cover
Vimco Mfg. Co. ....	214
Vogel Tool & Die Corp. ....	154
Vulcan Tool Co. ....	78

## **W**

Waldes Kohinoor, Inc. ....	159
Walker Co., Inc., O. S. ....	274
Walker-Turner Div., Rockwell Mfg. Co. ....	71
Walls Sales Corp. ....	256
Waltham Machine Wks., Inc. ....	262
Wardwell Mfg. Co. ....	210
Warner & Swasey Co. ....	27
Watts Bros. Tool Wks. ....	241
Weldon Tool Co. ....	290
Wells & Sons, W. F. ....	296
Wheel Trueing Tool Co. ....	60, 61
Wilson Mechanical Instrument Div. ....	63
Wood-Compton Co. ....	287
Woodruff & Stokes Co. ....	53

## **T**

Taft-Peirce Mfg. Co. ....	10
Texas Co. ....	Second Cover

## **Z**

Zagar, Inc. ....	191
Ziegler Tool Co., W. M. ....	231

# Time Saving Production and Checking Accessories

Here are three Sundstrand accessories that may prove helpful in your work. A wide range of bench centers and balancing tools are available for checking purposes. The automatic index base has proved a sound addition to many metal working machines. Write for further information.

## Bench Centers

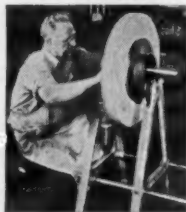
### For Precision Checking

Simplify assembly, lower spoilage and get better production from this modern Sundstrand Bench Center. You'll check work between centers easier, faster and within limits of .0001" on this improved Sundstrand Bench Center.

#### COMPLETE RANGE AS FOLLOWS:

6" x 18"	12" x 48"	24" x 48"
6" x 36"	12" x 60"	24" x 60"
12" x 36"	12" x 72"	24" x 72"

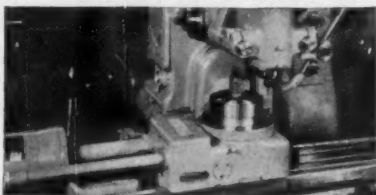
## Balancing Tools For Small Medium or Large Work



Sundstrand offers a complete line of balancing tools which will save their cost quickly on truing or balancing operations. Accurately sensitive and durable, they provide a simple, reliable means

for checking the balance of parts like gears shafts, fly wheels, pulleys, etc. Standard swing sizes range from 21 inches up to any swing desired. Length between standards ranges from 20 inches to any length desired.

## Automatic Index Base For More Production



This automatic index base is designed so there is no strain against the index plunger during the cut. The base is locked by powerful clamping so that accuracy of index is not affected by heavy cuts.

In many cases, the addition of this Automatic index base has increased milling production enough to eliminate need for the purchase of additional machinery. It may be the answer to your milling production requirements. Call in a Sundstrand engineer. There is no obligation for this.

## Free Data

Complete specifications are available on these three time saving accessories. Write for your copies today. Ask for bulletin 571.

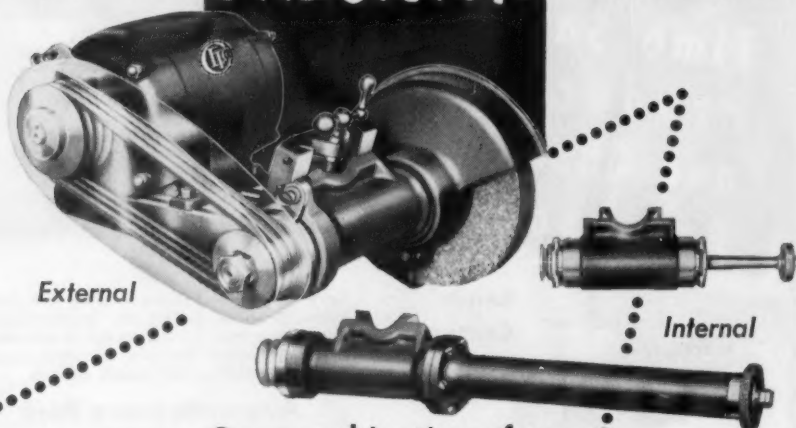


# SUNDSTRAND MACHINE TOOL CO.

2539 ELEVENTH ST. ROCKFORD, ILLINOIS, U.S.A.

For more data circle 514 on Reader Service Card

# VERSATILE **PRECISION** GRINDING!



Or a combination of  
both . . . or specials for single  
purpose application

Constant speed motor delivers consistent spindle speed under any load within rated capacity. External and internal grinding heads are interchangeable . . . internal spindles reversible for either left or right precision grinding . . . direction of rotation changed to suit. Large, flat mounting pad (with ample bolt slots) adds to grinder's versatility . . . can be mounted to nearly any other production machine for a wide range of accurate work, large or small. For adaptation to special, single purpose applications, write for details. Successfully used for grinding both the common and unusual materials.

Write for Catalog No. 56-ZA

## The CINCINNATI ELECTRICAL TOOL CO.

Division of The R. K. LeBlond Machine Tool Co.

2692 MADISON ROAD, CINCINNATI 8, OHIO



For more data circle 515 on Reader Service Card

↓ Use this Reader Service Card for requesting more information on products described and advertised ↓

# READER SERVICE CARD

August 1956 Issue

GOOD UNTIL OCTOBER 1, 1956

Your Name \_\_\_\_\_

Your Title \_\_\_\_\_

Company Name \_\_\_\_\_

Company Address \_\_\_\_\_

City \_\_\_\_\_

Zone \_\_\_\_\_

State \_\_\_\_\_

Products Manufactured \_\_\_\_\_

Number of Plant Employees \_\_\_\_\_

Circle KEY numbers (NOT PAGE NUMBERS) for more information on items described or advertised in this issue.

## EDITORIAL ITEMS

## ADVERTISEMENTS

1	21	41	61	81	101	121	141
2	22	42	62	82	102	122	142
3	23	43	63	83	103	123	143
4	24	44	64	84	104	124	144
5	25	45	65	85	105	125	145
6	26	46	66	86	106	126	146
7	27	47	67	87	107	127	147
8	28	48	68	88	108	128	148
9	29	49	69	89	109	129	149
10	30	50	70	90	110	130	150
11	31	51	71	91	111	131	151
12	32	52	72	92	112	132	152
13	33	53	73	93	113	133	153
14	34	54	74	94	114	134	154
15	35	55	75	95	115	135	155
16	36	56	76	96	116	136	156
17	37	57	77	97	117	137	157
18	38	58	78	98	118	138	158
19	39	59	79	99	119	139	159
20	40	60	80	100	120	140	160

First Cover	Second Cover	Third Cover	Fourth Cover
201	220	239	258
202	221	240	259
203	222	241	260
204	223	242	261
205	224	243	262
206	225	244	263
207	226	245	264
208	227	246	265
209	228	247	266
210	229	248	267
211	230	249	268
212	231	250	269
213	232	251	270
214	233	252	271
215	234	253	272
216	235	254	273
217	236	255	274
218	237	256	275
219	238	257	276
220	239	258	277
221	240	259	278
222	241	260	279
223	242	261	280
224	243	262	281
225	244	263	282
226	245	264	283
227	246	265	284
228	247	266	285
229	248	267	286
230	249	268	287
231	250	269	288
232	251	270	289
233	252	271	290
234	253	272	291
235	254	273	292
236	255	274	293
237	256	275	294
238	257	276	295
239	258	277	296
240	259	278	297
241	260	279	298
242	261	280	299
243	262	281	300
244	263	282	301
245	264	283	302
246	265	284	303
247	266	285	304
248	267	286	305
249	268	287	306
250	269	288	307
251	270	289	308
252	271	290	309
253	272	291	310
254	273	292	311
255	274	293	312
256	275	294	313
257	276	295	314
258	277	296	315
259	278	297	316
260	279	298	317
261	280	299	318
262	281	300	319
263	282	301	320
264	283	302	321
265	284	303	322
266	285	304	323
267	286	305	324
268	287	306	325
269	288	307	326
270	289	308	327
271	290	309	328
272	291	310	329
273	292	311	330
274	293	312	331
275	294	313	332
276	295	314	333
277	296	315	334
278	297	316	335
279	298	317	336
280	299	318	337
281	300	319	338
282	301	320	339
283	302	321	340
284	303	322	341
285	304	323	342
286	305	324	343
287	306	325	344
288	307	326	345
289	308	327	346
290	309	328	347
291	310	329	348
292	311	330	349
293	312	331	350
294	313	332	351
295	314	333	352
296	315	334	353
297	316	335	354
298	317	336	355
299	318	337	356
300	319	338	357
301	320	339	358
302	321	340	359
303	322	341	360
304	323	342	361
305	324	343	362
306	325	344	363
307	326	345	364
308	327	346	365
309	328	347	366
310	329	348	367
311	330	349	368
312	331	350	369
313	332	351	370
314	333	352	371
315	334	353	372
316	335	354	373
317	336	355	374
318	337	356	375
319	338	357	376
320	339	358	377
321	340	359	378
322	341	360	379
323	342	361	380
324	343	362	381
325	344	363	382
326	345	364	383
327	346	365	384
328	347	366	385
329	348	367	386
330	349	368	387
331	350	369	388
332	351	370	389
333	352	371	390
334	353	372	391
335	354	373	392
336	355	374	393
337	356	375	394
338	357	376	395
339	358	377	396
340	359	378	397
341	360	379	398
342	361	380	399
343	362	381	400
344	363	382	401
345	364	383	402
346	365	384	403
347	366	385	404
348	367	386	405
349	368	387	406
350	369	388	407
351	370	389	408
352	371	390	409
353	372	391	410
354	373	392	411
355	374	393	412
356	375	394	413
357	376	395	414
358	377	396	415
359	378	397	416
360	379	398	417
361	380	399	418
362	381	400	419
363	382	401	420
364	383	402	421
365	384	403	422
366	385	404	423
367	386	405	424
368	387	406	425
369	388	407	426
370	389	408	427
371	390	409	428
372	391	410	429
373	392	411	430
374	393	412	431
375	394	413	432
376	395	414	433
377	396	415	434
378	397	416	435
379	398	417	436
380	399	418	437
381	400	419	438
382	401	420	439
383	402	421	440
384	403	422	441
385	404	423	442
386	405	424	443
387	406	425	444
388	407	426	445
389	408	427	446
390	409	428	447
391	410	429	448
392	411	430	449
393	412	431	450
394	413	432	451
395	414	433	452
396	415	434	453
397	416	435	454
398	417	436	455
399	418	437	456
400	419	438	457
401	420	439	458
402	421	440	459
403	422	441	460
404	423	442	461
405	424	443	462
406	425	444	463
407	426	445	464
408	427	446	465
409	428	447	466
410	429	448	467
411	430	449	468
412	431	450	469
413	432	451	470
414	433	452	471
415	434	453	472
416	435	454	473
417	436	455	474
418	437	456	475
419	438	457	476
420	439	458	477
421	440	459	478
422	441	460	479
423	442	461	480
424	443	462	481
425	444	463	482
426	445	464	483
427	446	465	484
428	447	466	485
429	448	467	486
430	449	468	487
431	450	469	488
432	451	470	489
433	452	471	490
434	453	472	491
435	454	473	492
436	455	474	493
437	456	475	494
438	457	476	495
439	458	477	496
440	459	478	497
441	460	479	498
442	461	480	499
443	462	481	500
444	463	482	501
445	464	483	502
446	465	484	503
447	466	485	504
448	467	486	505
449	468	487	506
450	469	488	507
451	470	489	508
452	471	490	509
453	472	491	510
454	473	492	511
455	474	493	512
456	475	494	513
457	476	495	514
458	477	496	515
459	478	497	516
460	479	498	517
461	480	499	518
462	481	500	519
463	482	501	520
464	483	502	521
465	484	503	522
466	485	504	523
467	486	505	524
468	487	506	525
469	488	507	526
470	489	508	527
471	490	509	528
472	491	510	529
473	492	511	530
474	493	512	531
475	494	513	532
476	495	514	533
477	496	515	534
478	497	516	535
479	498	517	536</



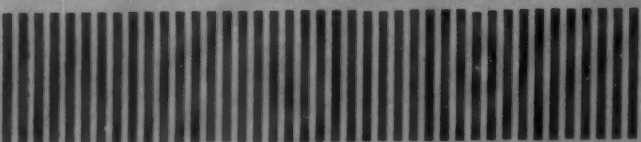
**FIRST CLASS**  
PERMIT No. 7414  
NEW YORK, N. Y.

**BUSINESS REPLY CARD**  
*No Postage Stamp Necessary If Mailed in the United States*

**4c POSTAGE WILL BE PAID BY—**

**modern  
machine  
shop**

**BOX 74  
VILLAGE STATION  
NEW YORK 14, NEW YORK**



# NEW (?) SLANT ON CUTTING TOOL SHARPENING

Form relief grind for cutting tools has been preferred for more years than we care to remember, yet it has never been practical, except on highly special tools, because of the cost—that is, until R-O came along. Now, on thousands of jobs, step drills, center cutters, reamers, recessing tools, hollow and profiling mills, taps, counterbores and many other standard tools are being made to last longer and perform better by the R-O method. Let us send you complete information.

**GRINDER DIVISION**  
**ROYAL OAK TOOL & MACHINE CO.,**  
29800 Stephenson Hy., Royal Oak, Mich.



**OLD METHOD**



**R-O METHOD**  
more metal to  
support edge

**RO**  
**UNIVERSAL**  
**FORM RELIEVING**  
**FIXTURE**

**R-O Grinder**



For more data circle "Third Cover" on Reader Service Card



INSIDE INFO FROM HOLO-KROME

## H-K's sharp socket corners resist reaming!

### THE SECRET'S IN THE SOCKET!

Sharp hex socket corners mean less reaming—the payoff's on the production line with fewer damaged screws, less downtime and improved product appearance!

### Compare These Other H-K Features!

**COMPLETELY FORGED SOCKET HEAD . . .** no drilling or broaching—metal fibers stay intact for stronger hex sockets.

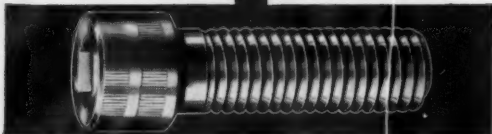
**SCIENTIFICALLY DESIGNED SOCKETS . . .** depth carefully proportioned to give greatest head and socket strength, firmest key grip.

**UNTAPERED WALLS . . .** for better key fit, longer key and socket life, even tighter wrenching.

For the finest in Socket Screw products . . . for revolutionary **SAME-DAY SERVICE**, the name to remember is Holo-Krome!

### LOOK INSIDE A HOLO-KROME SOCKET!

Send in the coupon below and we'll send you **FREE** an H-K Socket Cap Screw (we've omitted heat treating to let you get a better look at the mirror finish and sharp hex corners under the usual black finish). Look it over carefully, and see for yourself what a real difference H-K quality and skill can make!



Please send me **FREE** a Holo-Krome Socket Screw for my inspection.

NAME \_\_\_\_\_

POSITION \_\_\_\_\_

COMPANY \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_ ZONE \_\_\_\_\_ STATE \_\_\_\_\_



**HOLO-KROME**  
THE HOLO-KROME SCREW CORP., HARTFORD 10, CONN.

Sold only through authorized Holo-Krome distributors.